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REPORT
ON
GENERAL HOSPITALS

COMMITTEE ON PLAN PROJECTS

(BUILDINGS PROJECTS TEAM)

NEW DELHI

May, 1964

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COMPOSITION OF THE BUILDINGS PROJECTS TEAM

****

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Shri S.K. Patil, M.P., Formerly Minister for Food and Agriculture.

MEMBERS

Shri Sarup Singh, I.S.E. (Retd.), Formerly Director, National Buildings Organisation.

Shri N.G.Dewan, I.S.E., Chief Engineer, Central Public Works Department.

Maj. Genl. Harkirat Singh, Engineer-in-Chief, Army Head Quarters.

Shri N.V. Modak, Consulting Public Health Engineer, Bombay.

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MEMBER-SECRETARY

Shri T.S. Vedagiri, Chief Industrial Engineer, Bhilai Steel Plant, Bhilai.

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Shri M.D. Paul Manickam, Executive Engineer.

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Shri M. Thyagarajan.

Shri S.K. Patil, M.P.,
Leader,
Buildings Peojects Team.

No.COPP/BPT/9(1)
COMMITTEE ON PLAN PROJECTS
PLANNING COMMISSION
New Delhi-1.

May 19, 1964.

My dear Nanda Ji,

You may be aware that one of the important subjects taken up by the Buildings Projects Team concerned medical colleges and hospitals. The study was entrusted to two special Panels, one for Medical Colleges and Attached Hospitals and the other for General Hospitals. Col. Amir Chand was the Chairman of the first Panel and Dr. R. Viswanathan of the latter. Both the Panels contained eminent doctors, professors, engineers, architects and work study specialists.

As the problems of medical colleges and hospitals are interconnected, the Panels paid joint visits to several institutions and held discussions with authorities incharge.

The detailed study and critical analysis of the medical colleges recently constructed brought to light the wide divergence in the concept of requirements, design and consequently in cost. It established the need for laying down norms and standards for rationalising the architectural lay out. The Panel has attempted to achieve this in their recommendations.

The Report on Medical Colleges and attached Hospitals has already been published. In the present report on hospitals, the Panel has given careful consider-

ation in fixing up requirements of different sections of the hospitals and has given direction as to how the various facilities are to be planned with a view to getting a structure which will be satisfactory from the aesthetic, functional and economic viewpoints. The report also contains a table of requirements of hospitals for different bed strengths.

The very low ratio of hospital beds to the country's population is well known. The programme of constructing new hospitals and adding additional accommodation to existing hospitals is going to be long drawn and large funds would be required in the future plan periods.

It may be mentioned that for the first time an attempt has been made to give a detailed exposition of the various factors governing the planning and construction of hospitals. I hope that it will prove of help to authorities in charge of planning and construction of hospitals.

I cannot sufficiently thank the Chairman and Members of the Panel for the pains they have taken in analysing the various aspects connected with the design of hospitals in a systematic manner before coming to conclusions. My thanks are also due to the authorities incharge of hospitals both in the Centre and States for supplying all necessary data

and for helping the Panel in its site studies and discussions.

Yours sincerely,

S.K. Patil

Shri G.L. Nanda,
Minister for Home Affairs &
Chairman, C.O.P.P.,
New Delhi.

REPORT ON GENERAL HOSPITALS

C O N T E N T S

CHAPTERS		PAGE
0.	INTRODUCTION	i
1.	ADMINISTRATIVE UNIT	1
2.	OUT-PATIENT DEPARTMENT	3
3.	WARDS	41
4.	RADIOLOGY DEPARTMENT	73
5.	PHYSICAL MEDICINE DEPARTMENT	81
6.	OPERATING DEPARTMENT	85
7.	CENTRAL STERILISATION AND SUPPLY DEPARTMENT.	103
8.	MATERNITY AND GYNAECOLOGY DEPARTMENT.	111
9.	PSYCHIATRY DEPARTMENT.	133
10.	DIETARY SERVICE DEPARTMENT.	137
11.	LAUNDRY SERVICE DEPARTMENT.	152
12.	PLANNING AND SPECIFICATION.	160
13.	GENERAL HOSPITALS.	177
14.	RESIDENTIAL ACCOMMODATION.	185
15.	NURSING SCHOOL.	193

APPENDICES.

I.	WORKSTUDY IN HOSPITAL PLANNING AND ADMINISTRATION.	195
II.	STATEMENT OF FACILITIES IN DIFFERENT CATEGORIES OF HOSPITALS	207
III.	A TECHNICAL NOTE ON RECORD STORAGE.	241
IV.	SUMMARY OF IMPORTANT RECOMMENDATIONS ON RESIDENTIAL BUILDINGS.	247
V.	SUMMARY OF IMPORTANT RECOMMENDATIONS ON HOSTEL BUILDINGS.	250

INTRODUCTION

0.1 The shortage of hospital beds in the country has been emphasised by several Committees, reviewing the health facilities from time to time. The Bhore Committee carried out a survey in 1943 and formulated a programme for increasing the bed-population ratio progressively in two stages from 0.24 to 2 and from 2 to 5 per thousand. The position was again reviewed in 1960, by the Health Survey Committee headed by Dr. A. Lakshmanaswamy Mudaliar and it was recommended that the bed-population ratio be increased to 0.45. This still falls far below the standard prevailing in advanced countries, where it is as much as 10 beds per thousand and even 15 in some countries.

0.2 It was estimated that it would require about 20 lakhs beds to reach the figure of 5 beds per thousand against the existing number of 2 lakhs beds. This was considered beyond the reach of our present resources. Keeping this in view an austere standard of 1 bed per thousand population has been considered practical. This target is to be achieved by 1976.

0.3 Raising of the bed-population ratio from 0.45 to 1, will require an addition of about 1.5 lakhs of beds in each of the Third, Fourth and Fifth Plans. The cost of the civil works will alone be of the order of Rs. 150 crores under each plan period. There is further the cost of equipment and the running expenses. All these will naturally impose a heavy burden on the non-plan budget.

The question of economy in planning and construction of hospital therefore assumes importance.

0.4 A large number of hospitals have been constructed since the inception of the Five Year Plans but their architectural planning is not based on any rational norms and standards. The growth is unplanned and may even be described as haphazard. Our study and recommendations, it is hoped, will be of help to Architects and Engineers in fulfilling the dual objectives of economy and optimum utilisation of space. It is a truism to state that any unbalanced space provision, also adds to the operational cost.

0.5 The work is the outcome of deliberations of experienced men of medical profession including Surgeons and Physicians, Engineers, Architects and Work Study Specialists. It has been divided into two sections, one dealing with Medical Colleges and Teaching Hospitals and the other dealing with Hospital Buildings in general. This report deals with Hospital Buildings. The composition of the Panel of experts is given below:

Dr. R. Viswanathan, Director, Patel Chest Institute, Delhi.	Chairman
Col. Amir Chand, 12, Curzon Road, New Delhi.	Member
Dr. K.N. Rao, Addl. Director General, Ministry of Health, Patiala House, New Delhi.	Member

Brig. P.T. Joseph Consultant Surgeon to Armed Forces Hospitals, Office of the Director General, Armed Forces Medical Services, 'F' Block Hutments, New Delhi.	Member
Col. R.D. Ayyar, Medical Superintendent, Safdarjang Hospital, New Delhi.	Member
Dr. P.D. Srivastava, (Retd) M.S., 8 - La - Place, Shanaja Road, Lucknow (U.P)	Member
Dr. S. Seshagiri Rau, Chief, Health Division (Retd) Planning Commission, New Delhi.	Member
Dr. N. Jungalwalla, Dy. Director General of Health Services, New Delhi.	Member
Col. G. Benjamin, Dy. Director (Planning), Engineer-in-Chief s Branch, Army Headquarters, New Delhi.	Member
Shri J.D. Shastri, Senior Architect, T.B. Work Centre Building, Mathura Road, New Delhi.	Member
Shri N.K. Kothari, M/s Master, Sathe & Kothari, 65-G, Connaught Circus, New Delhi.	Member
Shri T.S. Vedagiri, Chief Industrial Engineer, Bhilai Steel Plant, Bhilai (Distt. Durg).	Member- Secretary

The subject of Health Centres has not been dealt with here as the National Buildings Organisation has already brought out literature on the subject.

0.6 The report does not cover specialised hospitals such as tuberculosis, cancer etc. It has not been possible for us to study these hospitals in the short time available. We, however, would suggest that the subject should also be studied by panels of this kind for establishing workable and economical standards.

We are extremely grateful to the authorities of the various hospitals visited by us for the facilities afforded for on-the-spot studies. We also offer our thanks to Sardar Indarjit Singh, formerly Secretary, Committee on Plan Projects for the interest he had taken in the work of the Panel and for his valuable advice on the several issues connected with the methodology of our work.

1. ADMINISTRATIVE UNIT

1.1 Efficient administration of the hospital is as essential as efficient medical facilities. In case of hospitals of moderate size, the Medical Superintendent also performs the managerial functions, but in the case of big hospitals, the latter's functions are sufficiently heavy to justify the employment of separate Administrative Officer, who may or may not be a professional. The Administrator looks after the personnel, management, purchasing of stores, maintenance and preparation of dietary, laundry and other functions, which through related, are strictly not medical.

1.2 In hospitals upto 200 beds, the following facilities may be provided for the administrative staff:

i) Medical Superintendent's room with toilet.	240 sft.
ii) Waiting room with toilet	240 sft.
iii) Library-cum-conference room	300 sft.
iv) Clerical Staff: @ 60 sft. per clerk (including Head Clerk)	400 sft.
Toilet facilities	120 sft.
v) Stationery room	200 sft.
vi) Furniture stores	300 sft.
vii) Medical stores	300 sft. may be attached to dispensary.
viii) Stores for linen and mattress	300 sft. may be attached to the ward complex.
ix) Engineering stores	400 sft.

1.3 In hospitals from 200 to 1000 beds, the facilities may be as follows:

i)	Medical Superintendent's room with toilet.	240 sft.
ii)	Asst. Medical Superintendent's room with toilet.	240 sft.
iii)	Private Secretaries to the M Medical Superintendent and Assistant Medical Superintendent.	180 sft.
iv)	Administrative Officer	180 sft.
v)	Waiting room with toilet	240 sft.
vi)	Library-cum-conference room	300 to 600 sft.
vii)	Clerical staff @ 40 sft. per Clerk (including Manager)	400 to 1200 sft.
	Toilet	120 to 180 sft.
	Strong room	120 sft.
viii)	Stationery and Records	200 to 320 sft.
ix)	Furniture Stores	300 to 600 sft.
x)	Medical Stores	300 to 600 sft.
xi)	Linen & mattress stores	300 to 600 sft.
xii)	Engineering stores	400 to 600 sft.

1.4 The administrative unit of the hospital should be an integral part of the hospital buildings but situated in a wing.

1.5 <u>Size of hospital</u>:

1.5.1 For the purpose of proportioning facilities, the hospitals are divided into the following three categoires:-

(a) Small hospitals - Bed strength upto 25

(b) Medium hospitals - Bed strength from 26

2. OUT-PATIENT DEPARTMENT.

2.1 Introduction:

2.1.1 Tho chapter deals with the clinics constituting an out-patient department of a general hospital. The sizes of the various facilities and the suggested disposition are the out come of discussions and work studies carried out by the Buildings Projects Team. Details of some of the studies are given in Appendix I.

2.1.2 Objective of the Out-patient Department. The out-patient department serves patients who do not require retention in the hospital for observation or treatment. It provides diagnostic, curative, preventive and rehabilitative services on an ambulatory basis. With the increase in population, the rise in the economic conditions of the community and the improvement in the standard of treatment in public hospitals, the pressure on hospital beds is fast increasing. It is indeed a formidable problem to be able to provide for sufficient hospital beds to care for the sick. It costs much more to maintain a patient in a hospital bed than give him medical treatment while the remains at home. The shortage in beds is likely to continue for a long time to come. It is therefore, far better to provide increased out-patient care than in-patient service.

2.1.3 Work Load: It is not feasible to correlate the extent of out patient facilities to the bed strength of a hospital. With greater emphasis on out-patient and domiciliary services, the range of work in the out-patient department is increasing. The extent of facilities which would be provided in any general hospital would depend upon the size of the community served by the hospital.

The number of patients visiting the out-patient department will depend upon the location of the department, the programme and resources, population and their needs, transport facilities and other factors. A careful assessment of these factors is necessary to assess the future requirements. The development of other health facilities in the neighbourhood should also be kept in view.

Hospital clinics function for about five to six hours a day - three to four hours in the morning and one to two hours in the afternoon. Our study of some hospitals shows that a doctor in-charge of a clinic has to examine about 25 to 40 patients per hours. This is considered to be an excessive and an undesirable load and we are of the view that for proper attention, a doctor should not be expected to attend to more than about 10 patients (new and old) per hours. However, under the prevailing conditions of inadequacy of medical

personnel, this number has to be exceeded but no doctor should be expected to attend to more than twenty patients, old and new, per hour. On this basis, the other connected facilities should be determined.

2.1.4 Size: The size of the O.P.D. depends upon the volume of attendance, the clinics provided and the extent of other facilities like laboratory, blood bank, health education programme, operating facilities, and an emergency department. The O.P.D. should be so laid out that it is capable of expansion for reasons discussed in para 2.1.3.

2.1.5 Siting: It is convenient to have a separate building for the O.P.D., attached to any hospital. It should be so sited that it can share with the in-patient department diagnostic facilities such as X-Ray and Pathology laboratory. It should be amenable to expansion without serious dislocation of work. It should also be readily accessible from the main entrance of the hospital and the patients should not have to pass through the in-patient department.

2.2. Planning:

2.2.1 Physical Facilities:

An O.P.D. includes Surgical, Medical, Ophthalmic, E.N.T., Orthopaedic, Dental, Venerealogy, Dermatology, Paediatric, Anti-rabic, Psychiatry, Emergency and Maternity departments. In addition, there are

ancillary facilities such as treatment sections including minor operation, injection, dressing and dispensary; auxiliary services of Pathology, Blood Bank and X-Ray. There is also a growing need for instituting health education programmes to educate the public in environmental hygiene, family planning etc.

2.3 Space requirements of various facilities:

2.3.1 Surgical Clinic: The pattern of consultation and examination cubicles fall into a common category. The cubicle should provide accommodation for a doctor's chair and table, patient's stool, follower's seat, wash-basin, examination couch and equipment for examination. The nature of work carried out in different clinics has been studied by us in detail to determine the space requirements. Considering the sizes of furniture, equipment and the extent of clear space required, the size of cubicle (single clinic) should be about 160 sft.

2.3.2 In many places every clinic is provided with lavatory. Since the use coefficient of this facility has been observed to be very low, the question of limiting the number to one for every two or three doctor units should receive consideration.

2.3.3 As mentioned above, each section may have more than one clinic in accordance with the volume of attendance. On an average each clinic will be able to handle 100 cases per day. The number of units in each clinic will depend upon the attendance. When

it is more than one, they should be arranged in the form of cubicles.

2.3.4 Dressing Room: Patients, after consultation, go to the dressing room. For convenience of patients and the surgeon, this should be placed next to the consultation room. The study of the O.P.D. has revealed that patients spend a good proportion of their time in waiting for their turn for dressing. This can be reduced if more than one dressing table is provided.

2.3.5 The room should be spacious enough to accommodate a medicine chest (preferably built-in), a wall counter for preparing dressings, medicine etc., two sinks, two dressing tables with a screen in between and a pedal operated bin to hold soiled material. The size of the room may be 180 sft. for accommodating two tables.

2.3.6 Waiting Space: In addition to the principal waiting area provided at the entrance for the visitors subsidiary waiting areas will be necessary close to the consultation and treatment rooms. In the surgical section, a waiting hall of a size sufficient to accommodate one third of the total number of patients visiting in one session or a minimum area of 150 sft. may be provided in between the surgical consultation and dressing rooms. The extent of waiting space required can be assessed by carrying out work-study.

2.3.7 Subsidiary waiting space, though essential, should not be overdone. The proportion of waiting space in an out-patient department was found to be as high as 32% of the total floor area of the department. Where, at the most four doctors could be in attendance, a waiting hall of size 2400 sft. was proposed, which could accommodate about 300 patients. A little calculation of to the length of session and the number of patients that the doctors can reasonably examine per session, would have broughtout the excessive provision. In a session of four hours, only about 300 patients could be examined. Assuming that almost all the patients would have someone accompanying them (which is obviously far-fetched) the total number of visitors would be about 600. This entire number do not gather at the same time. Our studies have shown that at the peak, the number of persons waiting at any one time in the area is not more than one third of the total number of patients visiting the clinic in a day. On this basis the expected gathering of patients could only be about 100 and the space required for waiting would only be about 800 sft. against 2400 sft. provided. This may be an extreme case. It however emphasizes the need for logical proportioning of facilities.

2.3.8 Based on our studies, we suggest that waiting area may be provided at the rate of 8 sft. per patient for one third of the maximum number of the

patients attending the clinic in one session.

2.4 Medical Clinic:

2.4.1 Consultation Room: This will be identical to the one described under surgical clinic both in size and facilities within. The number of clinics will depend upon the clinical visits. As mentioned earlier a clinic can cope with about 100 visits per day.

2.4.2 Examination Room: Attached to the consultation room and connected by a door; there should be room of a size about 150 sft. to contain the electro cardiograph equipment.

2.4.3 Waiting Space: Subsidiary waiting areas are essential next to consultation rooms. They may be independent or be shared between two clinics. Waiting area may be determined as indicated in para 2.3.8

2.5 E.N.T. Clinic :

2.5.1 Consultation Room: The size of the consultation room will be 150 to 180 sft. including facilities for examination.

2.5.2 Treatment Room: A separate treatment room for the E.N.T. section attached to the consulting room is essential. The size may be 100 to 120 sft.

2.5.3 Waiting Space: Since patients will have to wait both for examination and treatment, a common hall may be provided in between the consultation and treatment rooms to accommodate one third of the maximum number of estimated daily visits to the clinic.

2.5.4 Audiometric Room: A sound-proof room of size about 120 sft. may be attached to the E.N.T. Department. This facility is provided only in Divisional or bigger Hospitals.

2.6 Eye Clinic:

2.6.1 Waiting Space: The size of the sub-waiting area of this clinic is determined on the basis discussed earlier. The area should not be subject to direct light and glare and should be treated with a pleasant colour.

2.6.2 Consultation Room: The size of the consultation room can be identical with that of the E.N.T. department viz. 150 to 180 sft.

2.6.3 Refraction Room: For testing the state of refractive power of the eye, a room of length not less than 22 ft. is essential. By the use of mirrors which double the distance, it is possible to reduce the length of the room; the former arrangement requires an area of 160 sft. (20' x 8') and the latter about 100 sft. In smaller hospitals, where the number of clinics is not more than one, the facilities for consultation, examination and refraction can be confined to a single room, in which case the size of the room may be 200 to 240 sft.

If larger number of refraction cubicles are required, they may be planned with the advantage of mirror arrangement. In space of about 20' x 18' it will be possible to arrange six cubicles of size 6' x 7' each, facing each other.

2.6.4 Perimeter Room: The extent of field of vision is measured with a perimeter. The size of this room may be about 120 sft. This should be next to the refraction room.

2.6.5 Tono-graphy Room: The size should be the same as Perimeter room, and should be placed next to it. The instrument to measure the tension of eye-ball is kept in this room.

2.6.6 Slit Lamp Room: Same as the size of the Perimeter room and is grouped with other diagnostic rooms.

2.6.7 Orthoptics: For the treatment of amblyopia, muscle imbalance and strabismus etc. one or two rooms each of about 150 sft. may be provided.

2.6.8. Operating Department: This is discussed under 'Operating Department' in Chapter 6.

2.6.9 Planning: The facilities described above are not necessarily provided in all general hospitals. In fact they are constituents of a fulfledged eye hospital. In district or sub-divisional hospitals, it would be sufficient to provide two rooms 180 sft. each, one for diagnosis and the other for treatment. In addition, waiting space would also be required.

The diagnostic facilities of this department are shared by the out-patient and in-patient departments. It would be functionally advantageous to plan the in-patient section contiguous to the out-patient section

placing the diagnostic facilities in between.

2.7 V.D. and Skin Clinics: The department of Skin and V.D. are separate but in smaller hospitals these are generally combined by proper scheduling and the same accommodation may be used. Larger hospitals, however, should have independent space provisions for Skin and V.D. clinics.

2.7.1 Consultation Room: The space for consultation and examination may be about 150 to 180 sft. for each clinic. The number of clinics will depend upon the volume of attendance.

2.7.2 Treatment: Treatment includes special injections which cannot be done in the general injection room with desired degree of privacy. A minimum of two treatment cubicles of size 120 sft. for each sex may be attached to the consultation room.

2.8 Orthopaedic Clinic:

2.8.1 The orthopaedic clinic of the O.P.D. includes elaborate arrangements for consultation, examination, plaster preparation, x-ray, and treatment. The clinic will either have a separate x-ray plant or preferably make use of a mobile plant which will be serving the whole out-patient department.

2.8.2 Siting: Since the department includes elaborate arrangements for treatment, the facilities provided for the in-patients, out-patients and casualty

are grouped together in order to make the maximum use of the equipment etc.

2.8.3 Consultation Room: Patients may have to be brought on stretchers or in wheel chairs. In order to accommodate such movements, the size of the room may be 180 sft. It should be provided with doors of say 5'-0" width to permit free movement of conveyors.

2.8.4 Plaster Preparation Room: A room of size 120 sft. is necessary for storing plaster materials, and other therapeutic aids and for preparing plaster bandages.

2.8.5 Fracture and Treatment Room: This should be spacious enough to accommodate a dressing couch and a mobile x-ray plant. The size may be 180 sft.

2.8.6 Recovery Room: A recovery room adjacent to the fracture and treatment room is essential. The size may be 120 sft.

2.8.7 Waiting Space: Waiting area may be assessed at the rate of 10 sft. per patient and for a maximum of one third of the total estimated visits per day.

2.9 Dental Clinic:

2.9.1 There need not be separate rooms for consultation, x-ray and treatment since the functions of this department could be combined. All the facilities, may therefore be grouped and provided in one room of size 180 sft. with an attached office of 120 sft.

2.9.2 Waiting Space: A lobby of size 100 to 120 sft.will suffice for an attendance of 50 to 60 patients per session.

2.9.3 Recovery Room: It is not always possible for the patients to leave the clinic immediately after treatment. They require rest for a while generally in a lying position. A recovery room with one or two beds and one or two chairs may be provided. Size may be 120 to 150 sft.

2.10 Paediatric Clinic:

2.10.1 This is observed to be generally over crowded. The clinic should include a large reception-cum-waiting hall, consultation room and an examination room and treatment room.

2.10.2 Waiting Hall: Children get restless while waiting. The hall should therefore, provide for minor recreation and playing facilities. Its size is given in Appendix II. It should also have toilet facilities, the size of which may be 80 sft.

2.10.3 Consultation and Examination: The size of each cubicle may be about 150 sft. The number of units may be determined taking into account the total load and the manageable load of one unit.

2.10.4 Dressing, Treatment and Dispensary: It is considered advantageous if dressing and treatment facilities for children are attached to the clinic. The

space required will be about 360 sft. These facilities are required only in large hospitals with 500 beds and above. In smaller hospitals a room of size 120 sft. provided in continuation of the examination room would suffice.

2.11 Psychiatry:

2.11.1 Demand for psychiatric services is on the increase. The facilities required for the clinic include waiting space, consultation and examination rooms and a treatment room.

2.11.2 Waiting Space: This should be similar to other departments.

2.11.3 Consultation Room: Cubicles of size 120 to 150 sft. each are provided according to work load. In addition, a room for the social worker is provided, where the history and background of the patients are ascertained. Record pertaining to the patients undergoing treatment are kept here. The size of the room should be 150 sft.

2.11.4 Examination Room: Equipment such as E.E.G. and E.C.T. are employed for examination. They are provided only in larger hospitals and are discussed in Chapter 9.

2.11.5 Treatment Room: Shock treatment is common in this unit. A resuscitation room with one or two beds or more is needed. The minimum size of the room may be 160 sft. for one bed. For every additional bed, area required is 80 sft.

2.11.6 Siting: It is no longer desired to segregate psychiatric patients from the rest. The psychiatric clinic is placed amidst other clinics in O.P.D. complex. Where psychiatric services are on part time basis, possibility of sharing physical facilities with other clinics should be considered. Ful-fledged independant unit must be planned only in larger hospitals where justified by the load.

2.12 Maternity Services: A general hospital renders both out and in-patient service in obstetrics and children care. The facilities required in out and in-patient sections are discussed in detail in Chapter 8.

2.13 Infectious Disease Clinic:

2.13.1 Among the patients visiting the out-patient department, a few are likely to have infectious and communicable diseases. It will be the responsibility of the hospital administration to indentify such cases and segregate them. They may be either admitted immediately into isolation wards, or referred to infectious diseases hospital or treated as out-patients for a brief period in a distinctly separate area in the out-patient department complex.

2.13.2 If infectious diseases hospitals are not available in the vicinity, facilities may be provided in the hospital for rendering out-patient service. The space requirement will be about 300 sft. both for examination and treatment.

2.13.3 The unit should be located in isolation preferably in a corner, provided with independent access and completely cut-off from the rest of the hospital.

2.14 Health Education:

2.14.1 The importance of health education is being increasingly recognised as an effective tool of preventive treatment. People visiting the hospital should be given the opportunity to know several ways and means of keeping healthy. They should be informed of environmental hygiene, clean habits, need for taking preventive measures against epidemics, family planning etc. It will be desirable and advantageous to exhibit models, charts etc in the general waiting hall on hygiene and other public health sciences.

2,15 Accident and Emergency Department:

2.15.1 This is exclusively intended for accident and emergency cases. In bigger hospitals this is an independent department working round the clock in smaller hospitals, it is also independent but scheduled to function outside the working hours of other clinics of the O.P.D.

2.15.2 The physical facilities of the department will include accommodation for out-patients and in-patients in one block with a separate entrance for ambulances, all facilities for reception and immediate treatment

including x-ray unit, operation theatres, clinical laboratory, the necessary ancillary services and resuscitation services.

2.15.3 Siting : It is advantageously located in the complex of the out-patient department for reasons of easy accessibility and sharing medical facilities with the out-patient department. Approach to the emergency department should be independent. We had an occasion to witness emergency cases passing through the crowded entrance hall. Quick and easy access are absolutely essential for the accident and emergency department. It should invariably be placed on the ground floor. Adequate guidance of route should be ensured from the main gate upto the doorway of the reception hall of the department.

2.15.4 Physical Facilities: Adequate facilities should be provided to cope with major accidents from traffic mishaps, house collapses and fire etc. which might bring in a score of patients with little or no warning. The facilities will include the following:-

(i)
(i) Ambulance Entrance.
(ii) Reception for Patients.
(iii) Waiting Area.
(iv) Examination Room.
(v) X-Ray Examination.
(vi) Laboratory.
(vii) Treatment Room.
(viii) Operation Theatres.
(ix) Recovery Ward with Toilet.
(x) Observation Ward.
(xi) Nurses' Duty Room with Toilet.
(xii) Doctors' Room with Resting and Lavatory Convenience.
(xiii) Store.

2.15.5 Ambulance Approach: There should be a good ambulance approach with space permitting free passage of vehicles and covered area for alighting patients. Ramps should be provided in preferance to steps.

2.15.6 Reception Area: The arrangements for the reception of trolley and walking patients should be close but independent. Persons accompanying the patients will wait in this area.

The reception area will include a counter for the receptionist equipped with telephone services for internal and external communications. Accident cases are closely associated with the police department. In major hospitals, a separate room for their use is a necessity.

From the reception area it should be possible to enter directly the treatment and examination areas. The size of the reception hall may be 150 to 250 sft. Varying with the size of the department. Toilet facilities must be provided for both men and women separately. The receptionist who will be a nurse on duty should have a room along with the counter, the size of which may be 150 sft. including toilet facilities.

2.15.7 Examination Room: There should be a minimum of two cubicles, for men and women. Size may be 80 sft. each. Many a times, patients come in appreciable number, in which case, more cubicles will be required.
It is therefore essential to assess the probable volume

of attenance, before fixing up the number of cubicles.

2.15.8 X-Ray Examination: The O.P.D. must have a mobile X-ray equipment, which can be shared by all clinics. An alcove of about 80 sft. attached to the operating theatre will suffice.

2.15.9 Laboratory: A room of 120 sft. may be provided for the purpose.

2.15.10 Treatment Room: Patients may be either admitted direct to the treatment room or transferred from the examination room. The size of the treatment room may be 150 to 300 sft. according to the volume of equipment. It should also have a plaster room to meet needs of fracture cases. Alternatively it should be possible to share the fracture clinic attached to the orthopaedic clinic of the O.P.D.

2.15.11 Operating Room: Many cases require minor operation and retention in the ward for observation for a few hours. It is accepted that such cases can be attended to in the out-patient department itself, thus minimising the load on the in-patient department. The size of the theatre may be about 18' x 18' (324 sft.) It should be placed to serve both the out-patient and the emergency departments. If, however the emergency department has enough load of its own, it may be provided with an independent theatre, major in character. Its

size with the ancillary accommodation will be about 600 sft.

2.15.12 Ward: Patients, drawn from clinics other than the emergency unit and operated upon for minor cases, will require brief halt in the department. A ward with two to four beds, attached to the minor operation theatre, will be essential. Each bed will require a space of 70 sft. The ward will be attached with toilet facilities.

The emergency unit will require another ward with four to eight beds. In city hospitals this may go upto 40 or even 60. Where there are a number of hospitals, the accident and emergency department should be attached to only one hospital in order to make the best use of expensive equipment. Similarly care of burn cases can be concentrated in any one of the major hospitals. Area per bed in the ward of the accident and emergency department must be 80 sft.

Ancillary facilities will be similar to those provided for nursing units of the in-patient department excluding dining and day space.

2.15.13 Ambulance Vehicle Garage: The emergency department would possess one to three ambulances vans for emergency needs. In order to make them readily available, they should be parked in garages provided close to the emergency unit. Space requirement can be determined at the rate of 200 sft. per van.

2.15.14 Doctor's and Nurse's Duty Rooms: The doctor on duty must be available for all the 24 hours. For his convenience, a retiring room attached with toilet facilities should be provided. The size may be 250 sft. including bath and w.c., etc. The nurses duty room may be of size 160 sft. with toilet facilities.

2.15.15 Stores: A room of 200 sft. may be provided.

2.15.16 A retiring room with sanitary facilities may be provided for drivers on duty. The area may be 160 sft. We are of the view that no family accommodation should be provided in the hospital campus for the purpose.

2.16 Dispensary (Pharmacy):

2.16.1 The dispensary should be located in an area conveniently accessible from the several clinics.

2.16.2 Waiting Hall: The dispensary is generally the last department to be visited by the patients. When they reaches there, they are in a tired state. Further delay is irksome. It is therefore, imperative that waiting room should be comfortable.

The size of the hall depends upon the volume of attendance and the mode and efficiency of dispensing. The accommodation should be adequate to contain about 5% of the total clinical visits to the out-patient department in one session.

Area should be determined at the rate of 8 sft. per patient; the waiting hall shall have lavatory facilities provided for patients of both sexes independently.

2.16.3 Dispensing Room: The dispensing and compounding room will have multiple dispensing windows, compounding counters, drug storage cabinets and shelves. The pattern of arranging the counters and shelves determines the size of the room. The Building Projects Team carried out work studies in this regard and evolved a design for the counters medicine racks etc., and a plan indicating the position of these facilities within the room which would accelerate the rate of dispensing, is given in Chart. 3 of Appendix I. The gist of the study which was carried out in respect of an O.P.D. at the Irwin Hospital, New Delhi, is also given in Appendix I. Incidentally it high lights the value of work-study technique in determining the optimum size of a facility.

The size of the dispensing room may vary from 120 sft. to 320 sft. according to the size of the O.P.D.

2.16.4 Preparation Room: For mixture preparation and keeping medicines in store for distribution to in-patient sections, a specific area should be indicated within the dispensing room.

2.16.5 Medicine Stores: In small hospitals, the medicines required for a week are drawn in small quantities from the main stores of the hospital and are kept in storage cabinets and shelves within the dispensary room itself.

For large hospitals, a separate store attached to the dispensary is essential for storing weekly requirements which are drawn from main stores and for preparing stock mixtures etc. Obviously the size of the store room will depend upon the capacity of the O.P.D. It may be between 100 to 200 sft.

In small hospitals, medicines which require cold storage, may be kept in refrigerators. In large hospitals, however, the general medical store should have cold storage arrangement. In addition, a refrigerator may be kept in the dispensary.

2.17 Injection Clinic:

2.17.1 Patients, requiring injection treatment, attend the injection clinic. This requires waiting area for about 10 to 20 patients at the rate of 6 to 8 sft. per patient. In smaller hospitals a room of a size of about 120 sft. will be adequate, but in large hospitals, it must contain two to four (open) cubicles for treating men and women separately. One or two recovery rooms will be required in larger hospitals. The space requirement in a larger hospital may be upto 400 sft.

2.17.2 This may be placed in conjunction with the dispensary. It may be so planned as to share the waiting area of the dispensary.

2.18 Blood Bank:

2.18.1 The necessity of a blood bank needs no mention. Since the O.P.D. attends to emergency cases the blood bank is located here. The unit will include a reception-cum-waiting room, bleeding room, laboratory for grouping etc. recovery room and a room for storage of blood.

2.18.2 Reception Room: A room of size 120 to 160 sft. comfortable and attractive, will serve the purpose.

2.18.3 Bleeding Room: There may be one or two tables. The size may be about 120 to 160 sft.

2.18.4 Laboratory: The size may be 120 to 240 sft. depending upon the attendance.

2.18.5 Recovery Room: It may contain about two beds where the donors can rest and have refreshments. The size of the room may be 120 to 150 sft.

2.18.6 Storage: The hospital has to hold certain quantity of blood in stock for hospital use. The stock may be stored either in an air-conditioned room of the size of 6' x 6' x 8' or refrigerators of suitable capacities.

2.18.7 Washing and Sterilizing: Facilities for washing and sterilizing blood bottles and other instruments may be provided and its area may be 80 to 100 sft.

2.18.8 Office Room: The officer in charge of the unit will require a room for his office work. Records

pertaining to the donors are also maintained here. The storage place of blood can also be attached to the office room. An area of 120 sft. will suffice.

2.18.9 Toilet Facilities: It will be advantageous if toilet facilities are provided in common for the reception and recovery rooms.

2.19 Laboratory:

2.19.1 For quick diagnosis adequate laboratory facilities are a must. In the hospital set up, the services of a group of departments such as radiology and pathology are common both to out and in-patient department, which are concerned with investigations.

2.19.2 In addition to diagnosis and checkup during the course of treatment, the hospital laboratories will extend services to the general practitioners also. Further the laboratories should be planned to meet the present as well as anticipated requirements.

2.19.3 Siting: The laboratory is an integral part of the hospital. In small hospitals it may be housed in two or three rooms forming part of the O.P.D. but in larger hospitals, a separate wing or a building will be required depending upon anticipated future developments. Since laboratory facilities are availed both by out and in-patient departments, it should be so sited as to be conveniently accessible to both.

2.19.4 Orientation: Where the microscopic examination is done and natural lighting is relied upon, the orientation should be suitable and avoid glare.

2.19.5 Finishes: Laboratory work means long hours of standing and walking. It is desirable to have a resilient floor. This also reduces breakage. Wall finish may be smilar to an office.

2.19.6 List of rooms and space requirements: The facilities required in a sub-divisional hospital, divisional hospital, city hospital and teaching or reference hospital will differ. The requirements of the teaching hospital are dealt with separately in a companion report. For a divisional hospital the following is the space scale:-

S.No.	Description	Area sft.	Remarks
i.	Laboratory Superintendent's office-cum-research room with toilet attached.	200	Only in hospitals of 200 beds and more.
ii.	General Laboratory.	300 to 400	-
iii.	Washing & sterilising.	120 to 150	In hospitals of 100 beds and more.
iv.	EKG, BMR, specimen room.	200 to 240	-do-
v.	Bacteriology & Seriology.	200 to 240	In hospitals of 200 beds and more.
vi)	Storage.	80 to 120	In hospitals of 100 beds and more.
vii.	Reception area.	120 to 150	-do-

2.19.7 Clinical Pathology: Examination of urine, blood and stool is carried out in the general laboratory.

2.19.8 Chemistry: The general laboratory includes facilities for chemical analysis of specimen. A place for keeping the balance should be kept in view.

2.19.9 Bacteriology & Seriology: This department is concerned with the bacteriological study of diseases and of human blood serum. A kitchen is required for preparation of media. The size may be 120 sft.

2.20 Medical Records:

2.20.1 Medical records, maintained with care can be of great help in furthering patient care and medical education. Current records, pertaining to patients undergoing treatment, are kept in the department responsible for the care. When treatment is over and patient is discharged, the records are transferred to 'active record storage' where they are retained for a year or so. Thereafter, if the patient does not revisit the hospital, the record is transferred to the 'in-active storage' where they are maintained in an identifiable manner. The record storage can be located next to the registration area for convenience in handling. The length of retention of these records is conditioned by medical and legal aspects. However, the space may be sufficient to hold records build-up for a period

of ten years. It is estimated that a standard 12 inch open shelf will hold about 10 records per inch. A 50 bed hospital will require about 120 sft. of shelving and a 500 bed hospital about 1600 ft. of shelving. In addition, work tables and chairs will be required. In teaching hospital the space requirement will be much more than in non-teaching hospitals. The subject is dealt with in the report on Medical Colleges and Teaching Hospitals.

2.20.2 Planning of Record Rooms: The records in 'active storage' are likely to be handled more often than those in 'in active storage'. It is therefore suggested that in the former area, the shelves may be of 'fixed type' with aisles 2'-6" to 3'-0" wide, and in the later, movable racks on rails may be adopted resulting in 40 to 45% and 65% of space utilisation respectively. A technical note on record storage is given in Apppendix III.

2.21 Public Areas: In O.P.D. a patient first enters the reception hall, contacts the registration counter, gets screened to know the clinic, visits the clinic for examination, gets treated and dispensed, and then leaves the department. Most of these facilities have been discussed above. We have, however, to consider the entrance hall, enquiry counter, serving area, registration section, waiting area, toilets and tea bar.

2.21.1 Entrance Hall: The entrance hall should be dignified, simple and attractive; it should have a

pleasant colour scheme and be well lighted. The enquiry and registration counters should pen into the entrance hall. Patients wait in this area before getting registered and screened. Some of the followers will wait here for the return of the patient.

The size of the hall may vary from 400 to 2000 sft. for out-patient departments with attendance varying from 400 to 2000. The area may be determined on the basis of 1 sft. per patient with a minimum of 400 sft.

Many instances are known where the entrance halls have been overdone having no relationship to the strength of the visitors. In double and multi-storey buildings the entrance halls get duplicated in every floor for structural reason. It is, therefore, absolutely necessary that the size of the hall should be determined as accurately as possible and should not be repeated in every floor without purpose.

Since the entrance hall accommodates patients waiting for registration, the space requirement depends also on the procedure followed in respect of registration. In one of the cases studied by the team it was found that the period of registration was between 8.00 and 10.00 hours and the period of examination in clinics was between 8.00 and 12.30 hours. This resulted in over crowding. The authorities of the hospital were advised to extend the registration hours upto 11.30 hours. This resulted

in a large reduction in the waiting density. The case is described in Chart 2 Appendix I. It shows how a thoughtless arrangement causes inconvenience and seriously impairs the utility of an important facility.

2.21.2 Waiting Areas: We have noticed in many hospitals patients waiting in verandahs obstructing the flow of traffic. Apart from the entrance hall, subsidiary waiting areas are essential adjacents to the various diagnostic and therapy rooms, in para 2.3.7. The maximum number of persons who will be waiting at any clinic at any time is about 20, taking 60 to 80 patients as a reasonable load for each doctor per session. The space requirement therefore, is about 140 sft. which is more or less equal to the size of a clinical unit for one doctor.

The number of units under each clinic varies with the patient load. Where there are more than one units, the waiting area must be planned in common between them. Similarly the waiting areas of the examination and treatment units must be combined. If sexwise segregation is desired, the areas may be separate.

2.21.3 Tea Bar: Visitors and followers accompanying patients may have to wait for an hour or more, within the complex of O.P.D. It would make their stay pleasant, if they can obtain tea or coffee or cold drinks. The arrangement should be simple and limited to drinks.

Snack bar or restaurant service is not desirable. The size of the facility with a large service window will be about 120 sft.

2.21.4 Administration: In small hospitals the Medical Superintendent of the hospital himself supervises the function of the O.P.D. He will have an office room in the main administrative building and another in the O.P.D. may not be necessary. However in larger hospitals with 200 beds and above it will be necessary to have an officer solely for supervising the work of the O.P.D. He will have an office of size 180 sft.

2.21.5 House keeping: Every floor should be provided with janitor closet for house keeping and cleansing materials. The size of the room may be 40 sft. The space below the stair case may be utilised for this propose, if possible.

2.21.6 Storage Facilities:

Drug Store: Drug store of the entire hospital may be located in the out-patient area preferably below or close to the dispensary. The size will depend upon the out-patient and in-patient load. It may be from 300 sft. up-wards. A basement floor with a low roof will be ideal for handling storage.

Records: It is desirable to maintain the medical records of out and in-patients in a central place, preferably attached to the out-patient department in continuation of the registration area. The size of

it has already been discussed in para 2.20.2.

2.22 Planning :

2.22.1 Having discussed the extent of facilities and their space requirements, the next step should be to consider their functional relationship. This would help in fixing the disposition of the various facilities. Many hospitals visited and the layout studied by us showed lack of due appreciation of the inter-relationship. Surprisingly it is more pronounced in the hospitals which have recently been enlarged.

2.22.2 The size of a facility may be satisfactory by itself but the overall efficiency can be impaired if the facilities are not appropriately placed. Arrangement of facilities in proper order is therefore an important aspect of planning.

2.22.3 Planning must take care of the present programme and the future development. The number of units to be provided under each clinic must be related to the present and probable patient load, waiting areas must as far as possible, be combined, between two clinics. Diagnostic facilities such as Pathology and Radiology must be easily accessible. Out patients visiting these areas should not have to criss-cross in-patient traffic. Emergency department should be so located as to be easily accessible to accident cases and capable of drawing support from the orthopaedic clinic, and operating department and the mobile x-ray unit of the O.P.D.

Treatment facilities like pharmacy and injection clinic should be grouped together in order to stream line the movements.

2.22.4 If the clinics are placed in the ground and upper floors, the emergency, orthopaedic , surgical clinics, pathology laboratory, radiology unit, registration, pharmacy and the out-patient section of the maternity department should be kept on the ground floor.

2.22.5 A case study of the O.P.D. made by the workstudy group of the team, is given in Chart I of Appendix I. Studies of this kind are helpful in establishing the functional relationship of various facilities.

2.22.6 The Planning of an O.P.D. should be governed by the following considerations:

(1) Within the O.P.D. the physical facilities should be placed ensuring smooth flow of operation, easy and quick inter-communication.

(2) Services common both to the in-patient and out-patient departments should be readily and easily accessible from the O.P.D. and should not involve undue effort in movements.

(3) The location should permit future expansion.

(4) The schematic arrangement of facilities may be according to the flow chart given in Plate No. I.

2.23 Summary of space Standards (O.P.D)

Sl. No.	Name of Facility	Size in Sft.	Reference to para No.
1.	2.	3.	4.
	Surgical		
1.	Consultation Room (Single cubicle)	160	(2.3.1)
2.	Dressing Room (with two tables)	180	(2.3.5)
3.	Waiting Space (Minimum)	150	(2.3.6)
4.	Subsidiary waiting space.	8 per patient	(2.3.7)
	Medical		
5.	Examination room	150	(2.4.2)
6.	Waiting space	(As in S.No. 4 above).	(2.4.3)
	E.N.T.		
7.	Consultation Room	150 to 180	(2.5.1)
8.	Treatment Room	100 to 120	(2.5.2)
9.	Waiting Space	(As in S.No. 4 above.)	(2.5.3)
	Eye Clinic		
10.	* Consultation Room	150 to 180	(2.6.2)
11.	* Rofraction Room	200 to 240	(2.6.3)
12.	* Perimeter Room	120	(2.6.4)
13.	* Tono-graphy Room	120	(2.6.5)
14.	* Slit lamp Room	120	(2.6.6)
15.	* Orthoptics	150 each room.	(2.6.7)

1.	2.	3.	4.
	** Planning		
16.	Diagnostic Room	180	(2.6.9)
17.	Treatment Room	180	(2.6.9)
	V.D. and Skin Clinics		
18.	Consultation and Examination Room	150 to 180 for each clinic.	(2.7.1)
19.	Treatment Room	2 cubicles each of 120.	(2.7.2)
	Orthopaedic Clinic		
20.	Consultation Room	180	(2.8.3)
21.	Plaster Preparation Room.	120	(2.8.4)
22.	Fracture & Treatment Room.	180	(2.8.5)
23.	Recovery Room.	120	(2.8.6)
24.	Waiting Space.	@ 10 per patient.	(2.8.7)
	Dental Clinic		
25.	Consultation Examination & X-Ray Room.	180	(2.9.1)
26.	Office Room	120	(2.9.1)
27.	Recovery Room	120 to 150	(2.9.3)
	Paediatric Clinic:		
28.	Consultation and Examination Room.	150	(2.10.3)
29.	Dressing, Treatment and Dispensary.	360 for bigger Hospitals of 500 beds or above, 120 for smaller hospitals.	(2.10.4)

** These specifications are for a General Hospital having Eye Clini

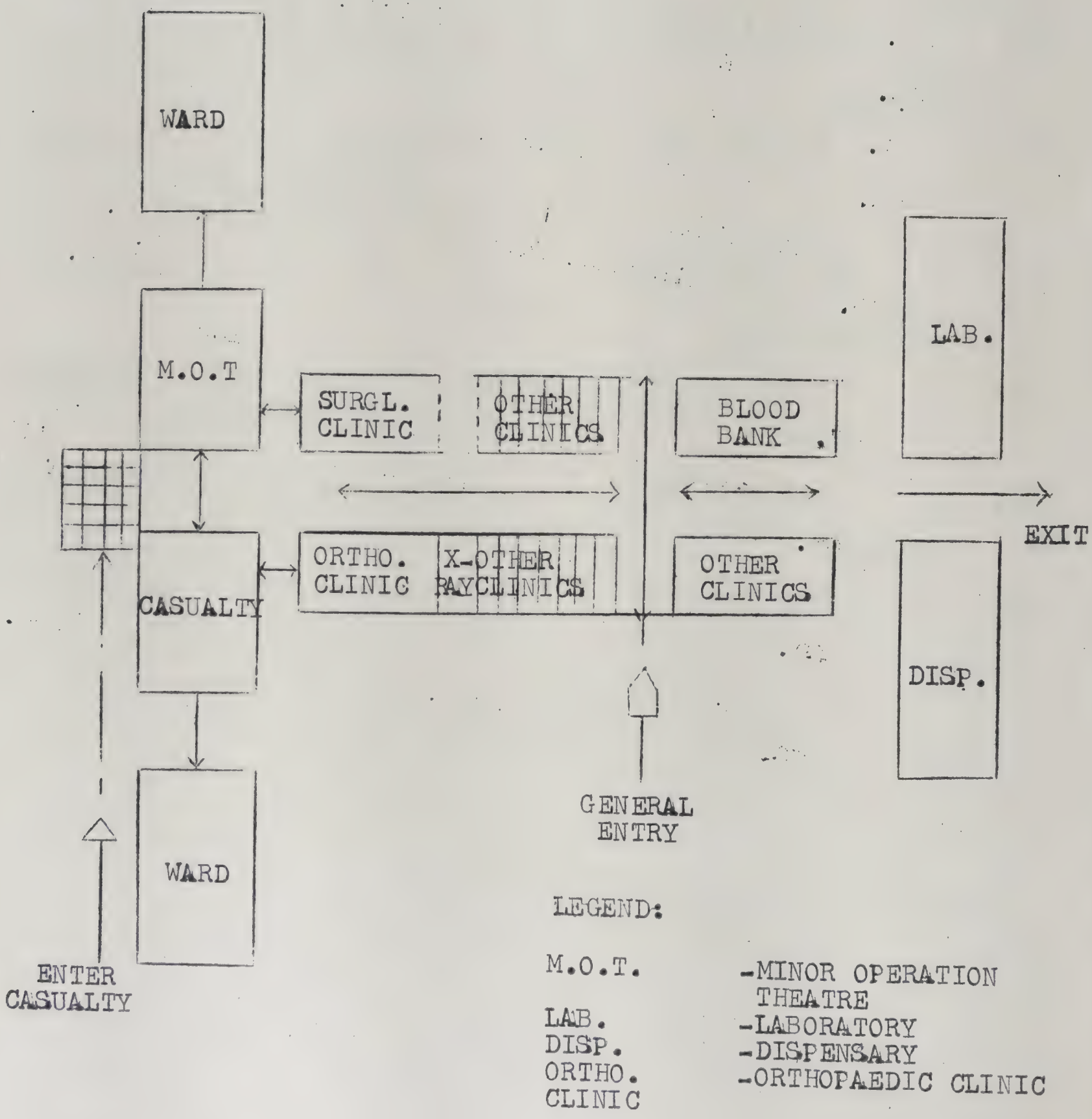
1.	2.	3.	4.
	Psychiatry		
30.	Consultation Room	120 to 150	(2.11.3)
31.	Room for Social Worker and Record Storage.	150 Please refer to Chapter 9.	(2.11.3) (2.11.4)
32.	Examination Room		
33.	Treatment Room.	Min. 160 for one bed.	(2.11.5)
	Infectious Diseases Clinic		
34.	Examination and Treatment Room.	300	(2.13.2)
	Accident and Emergency Deptt.		
35.	Reception Hall.	150 to 250	(2.15.6)
36.	Reception Counter with toilet facilities	150	(2.15.6)
37.	Examination Room	Two cubicles each of 80.	(2.15.7)
38.	X-Ray Examination	80	(2.15.8)
39.	Laboratory	120	(2.15.9)
40.	Treatment Room	150 to 300	(2.15.10)
41.	Operating Room	Minor=324 Major=600	(2.15.11)
42.	Ward attached to minor Operation Theatres.	@ 70 sft. per bed including. toilet facilities.	(2.15.12)
	Emergency Ward.	@ 80 per bed.	(2.15.12)
43.	Ambulance Vehicle Garage.	@ 200 per vehicle.	(2.15.13)

44.	Doctor's duty-cum-retiring room.	250	(2.15.14)
45.	Nurse's duty-cum-retiring room.	160	(2.15.14)
46.	Stores	200	(2.15.15)
47.	Retiring room for drivers.	160	(2.15.16)
	Dispensary (Pharmacy)		
48.	Waiting Hall.	@ 8 sft. per head of 5% of the total clinical visits.	(2.16.2)
49.	Dispensing Room	120 - 320	(2.16.3)
50.	Medicine Stores.	100 to 200	(2.16.5)
	Injection Clinic		
51.	Injection Room	120 to 400	(2.17.1)
	Blood Bank		
52.	Reception Room	120 to 160	(2.18.2)
53.	Bleeding Room	120 to 160	(2.18.3)
54.	Laboratary.	120 to 240	(2.18.4)
55.	Recovery Room	120 to 150	(2.18.5)
56.	Storage	36	(2.18.6)
57.	Washing & Sterilizing.	80 to 100	(2.18.7)
58.	Office Room	120	(2.18.8)
	Laboratories		
59.	Laboratory Superintendant's office-cum-research room, with W.C.	200	(2.19.6)

1.	2.	3.	4.
60.	General laboratory	300 to 400	(2.19.6)
61.	Washing & Sterilizing	120 to 150	"
62.	EKG, BMR, Specimen room.	200 to 240	(2.19.6)
63.	Bacteriology & Soriology.	200 to 240	"
64.	Storage	80 to 120	"
65.	Reception Area.	120 to 150	"
	General		
66.	Entrance Hall	(400 to 2,000 sft. or @ 1 sft. for one patient.	(2.21.1)
67.	Tea Bar.	120	(2.21.3)
	Administration		
68.	Medical Superintendent's Room.	(180 only in Hospitals with 200 beds or more.	(2.21.4)
69.	Janitor's Room.	40	(2.21.5)
	Storages		
70.	Drug Stores.	300 or more.	(2.21.6)

PLATE No. 1.
Para No. 2.2,2.6

OUT PATIENT DEPARTMENT
(FLOW CHART)



LEGEND:

M.O.T.	-MINOR OPERATION THEATRE
LAB.	-LABORATORY
DISP.	-DISPENSARY
ORTHO. CLINIC	-ORTHOPAEDIC CLINIC

3. WARDS

3.1 Introduction:

3.1.1 Wards in our country, are generally of the pavilion type where twenty to thirty beds are arranged at right angles to the longitudinal walls with ancillary rooms and service facilities placed at either end of the unit. Recently attempts have been made in few hospitals to provide bed rooms and cubicles, accommodating four to six beds in each, the beds being arranged parallel to the longitudinal walls. This arrangement is based on 'Rigs' pattern of wards and is considered advantageous as it gives more privacy and obviates glare. It is also helpful in segregating patients of like diseases and minimising chances of cross-infection.

There exists great disparity in the facilities provided in different hospitals; in respect of the width of ward, distance between bed centres, type and extent of ancillary accommodation, area per bed, concept of planning and so on. Such variations emphasize the need for establishing norms and standards of the various facilities in order to improve functional efficiency and effect economy in the cost of construction.

3.1.2 In planning a ward, the objective should be to provide favourable conditions per medical care and adequate amenity for the patient, consistent with economy. In order to arrive at economical and acceptable standards, a careful analysis was made of the proportion of facilities provided in several hospitals. For this purpose the facilities were grouped into three major heads as given below:.

Group	Primary Accommodation	Area Percentage
(A)	(i) Ward-General (Multiple beds)	
	(ii) Ward-Special (Single bed)	
(B)	Ancillary Accommodation:	
	(i) Clean Utility/Laboratory	
	(ii) Dirty Utility/Sluice Room.	
	(iii) Kitchen/Pantry	
	(iv) Treatment	
	(v) Nurse's Room.	
	(vi) Sister's Room.	
	(vii) Stores	
	(viii) Bath & W.C. (with number).	
	(ix) Day Room/Dining Space.	
(C)	Circulation (within)	
		100%

It is evident from the Statement 'A' appended to the chapter that there is great divergence in the proportion of areas in respect of different groups.

3.1.3 Considerations for Planning: Whatever be the size and arrangement of wards, the space allowed around each bed should be fairly uniform as this is determined by nursing and hygienic considerations.

3.1.4 Ancillary accommodation should be provided satisfying the following conditions:

(i) Storage should be planned separately.
(ii) Jobs in clean and dirty sections should not get mixed up.
(iii) Kitchen or pantry should be adequately equipped to keep food and cutlery in clean condition.
(iv) The sanitary unit shall afford adequate facilities and be kept clean inducing patients to avail of their use.

3.1.5 One other important aspect to be considered is the segregation of ambulant, semi-ambulant and bed-fast patients. The last category patients should be concentrated around the nurses station to reduce her walking distance to the minimum.

3.1.6 Several models of wards can be tried combining the concept of 'Nightingale' as well as 'Rigs' type of wards, as indicated in Plate No.2, enclosed. Such studies are helpful in indentifying the best position of the nurse's duty room from where her access to the patients will be the shortest. Similarly the advantageous positions of the ancillary facilities are also determined keeping in view the degree of their importance and frequency of use.

3.1.7 Service is provided from the ancillary rooms

to the several beds in the wards. Clearly, a compact arrangement would minimise the service distances. As suggested in the report of the Nuffield Provincial Hospital Trust, it would be worth-while to make a critical study of linear density in beds per 10 ft. run of ward building. Densities observed in few cases are given in Statement-A.

3.1.8 'Nightingale' Vs. 'Rigs' types of Wards: In the Nightingale ward, commonly known as pavilion type ward, it is possible for the nurse to have an overall command whereas this is not so in the case of 'Rigs' type. In the case of latter, the nurse has to be regularly contacting one cubicle or the other to find out needs of the patients; obviously this system requires more nurses. In 'Nightingale' ward, patients are subjected to glare and enjoy practically no privacy. Whereas in 'Rigs' type ward glare is obviated, privacy is afforded and it is also possible to segregate patients according to gravity of sickness.

3.1.9 Single-bed Room: Increasing the number and size of single or two bedded rooms will not vie with the resources of finance and nursing personnel. The Panel considers desirable and sufficient to have a maximum of two single bedded rooms in every ward of twenty to thirty beds to accommodate such patients whose condition would require special nursing and treatment. It may also serve to accommodate staff or student patients.

In a few places, necessity might arise to provide one or two more single-bed rooms under the category of 'paying wards' with augmented facilities. This may be considered according to circumstances.

The size of the single bedded rooms placed in the complex of the ward unit shall not be more than 120 sft. excluding bath and w.c. Single bed rooms may be grouped together so that the w.c. and bath can be shared. Each room shall contain a hospital bed, a bed side locker preferably built-in, a comfortable chair for the patient, an arm chair for visitor and a built-in cupboard for keeping clothes. Provision of a wash basin within the room will add to convenience.

3.2 Planning

3.2.1 Considerations for planning a ward have been discussed above. The next step would be to consider whether wards should be spread out as would happen in the case of a single storey construction or stacked one above the other. The undesirable sprawl associated with single storey construction which creates problems of inter-communication and the advantage in the case of multistorey construction, of economy in services and ensuring compactness and control, need no emphasis.

3.2.2 Planning Ward Units: The compactness, desirable in the design of ward unit, is better appreciated if one understands the quantum of

movement a nurse under-takes within the bed area. The analysis of the proportion of the journeys made from the beds to each of the three or four principal ancillary rooms, namely the ward kitchen, the dirty utility room, stores and treatment room would help to determine the ways of reducing the lead to various points.

3.2.3 Planning the Bed Area: The bed is generally 3'-3" wide and 6'-6" long. It is kept a little away from the wall. There should be sufficient space between beds to avoid stagnation of air, permit use of treatment equipment and clinical trolleys, and reduce the risk of cross-infection. Considerations regarding the distance between bed centres have been varying. In early days it was kept at 6' and latter modified to 8'. However at present, new hospitals in the continent have 6'-0" and 6'-6" bed centres while in some places they are 7'-0". The Panel considers that 7'-0" between the bed centres is acceptable from medical considerations consistent with economy.

3.2.4 Provision of Verandahs: It has been customery to provide long verandahs on either side of the pavilion type of ward. This is assumed to have afforded comfort and scope for accommodating overflow. Our study revealed that the provision of verandahs can be substituted by chajjas or sun breakers

to provide the same degree of comfort at less cost. Regarding the other facility of accommodating overflow it is not considered conducive to keep the ward clean and fit for proper nursing. The provision of verandahs is not, therefore, recommended.

3.2.5 List of Rooms: The accommodation in each ward may be divided into the following categories:

A. Primary Accommodation:

(i) Multiple-bed Ward(s)
(ii) Single-bed Room(s)

B. Ancillary Accommodation

a) (i) Nurse's Room
(ii) Nurse's Lavatory and Cloak Room.
b) Clean Utility Room
c) Treatment Room
d) Pantry/Kitchen
e) Dining spade including Day Space.
f) Stores

C. Sanitary Accommodation

(i) Urinals and Water Closets
(ii) Bath Rooms and Wash-Basin.
(iii) Dirty Utility Room.

D. Service Facilities:

(i) Service Lifts (Food)
(ii) Linen Chute.

E. Auxilary Accommodation:

These may be spread between two or more wards.

a) Sister/Doctor's Room
b) Sister's waiting space.

F. Circulation

a) Circulation within the Ward Unit.
b) Circulation - General

Space Requirements: Be it a 'Nightingale' or 'Rigs' ward, the arrangement of beds is based on operational and medical requirements which are identical for both. The Panel recommends the following norms:

i) Distance between bed centres: 7'-0" as already stated in para 3.2.3. This may be increased to 8'-0" in the case of post-operative wards and teaching hospitals.

ii) Clearance between wall and bed-head of cot -------1'-0"

iii) Clearance between wall and side of cot in respect of the cot closer to the wall. ----2'-0"

iv) Aisle between two rows of cots. ---------5'-0"

The width of the ward has been found to vary from 18' to 24' in a good number of hospitals visited by the Panel and several other plans reviewed. Keeping in view the length of the bed which is 6'-6" and the norms indicated above, the Panel considers that the width of the ward should be 20' to accommodate two rows of beds placed perpendicular to the longitudinal walls. The Panel in fact observed in one of the recently constructed hospitals, the width of the ward being 19'-0" which was found to be adequate.
We consider that 20 ft. should suffice in all cases.

The area per bed within the ward, therefore, need not be more than 70 sft. Five different layouts are given in Plate No. 2. We consider that the layout suggested in type V is the best.

3.2.6 A modification of the pavilion type of ward is a long hall divided into compartments by partitions of masonry or wood upto to a height of about 3'-6" and transluscent material for an additional height of 2'-0". Such an arrangement enables beds to be provided parallel to the longitudinal walls with attendant advantages. The patients are also able to receive the attention of the nurse without difficulty.

3.2.7 Need for Standardising Beds: The Panel had also observed that the dimensions of the beds were not uniform. Since space planning is related to size of the beds, it should therefore be uniform. The most convenient length of the bed is 6'-6" and width 3'-3". It will not be out of place to mention that the specifications of the bed should be based on functional considerations with an eye on economy. Spring beds are intially comfortable but they sag with age and cause discomfort. Certain hospitals have provided beds with aluminium or zinc sheets. They are said to be uncomfortable since ventilation is cut off. A good design is hoop iron mesh revetted to frames. This ensures ventilation and does not sag with age. The pattern is also economical. We recommend this may be universally adopted till more comfortable and economical pattern is evolved.

For this type, the matress should be atleast 4 inches thick. Besides, the provision of

normal type of beds, it is necessary to have special Fowler's beds in each ward say at the rate of 10% of the total bed strength.

3.2.8 Bed-side lockers: Each bed needs a bed-side locker. The Panel had observed the provision of built-in lockers in some hospitals. This has proved economical it is a space saving device too. This aspect may be kept in view while planning a ward.

3.2.9 Consideration for Post-operative Wards: Post operative wards should be provided in every floor where there is an operation theatre and also in close proximity to the theatre, in a quiet atmosphere. The bed area in these wards will be obviously more in order to permit elaborate treatment and positioning of emergency equipment. Area per bed may be 80 to 90 sft. Air-conditioning in post-operative wards is essential which adds to the comfort and quick recovery of the patients. The number of beds provided in this ward do not count to-wards the bed strength of the hospital. The number of beds in each post operative ward may be determined at the rate of two per theatre.

3.2.10 Intensive Care Unit. As treatment is becoming increasingly complex, it is becoming more and more difficult to give the best attention to very ill patients when they are treated in ordinary wards. One way of getting over this difficulty is to put them in a special unit

called an intensive care unit which is better equipped and staffed.

An intensive care unit need not take all patients who are seriously ill. It is primarily meant for patients in a critical stage of illness. A purely surgical or medical unit, or one of each, may be needed, but a single unit would probably serve all acute specialities. The number of patients requiring intensive care may be about 5% of the total medical and surgical patients in an acute hospital. A unit should not have less than 6 beds or more than 12 beds, but two units could be linked.

There must be ample room for equipment and manoeuvre. There should be free access right around the patient. A generous space standard is therefore necessary and we would suggest an area about double the requirements of the bed area in a normal ward. The main part of the unit must be a well ventilated "open" space, but some patients may need cubicles which can also be used for special infection risks.

Where fixed equipment is used, such as suction and oxygen lines, this should be designed for flexibility.

In an intensive care unit, there should be larger number of nurses than in the other wards since the critically ill patients will require constant attention.

3.3 Ancillary Accommodation:

3.3.1 Nurses Room: The nurses room should be

so strategically positioned that they may be able, with convenience, to keep a continuous watch over the patients. The location of the room should receive utmost consideration. The room shall normally contain a cupboard to hold materials which might otherwise be placed in the clean utility room, a drug cupboard sink, chair, small table, telephone and call system points and records. Suitable size of the room is about 100 to 120 sft.

3.3.2 Nurses' Lavatory & Cloak Room: It is necessary to provide a lavatory and a cloak room. This need not be independent. It will be an advantage if it is combined with the duty room itself. Where the plan permits, the facility may be shared between more than one ward unit. If it is intended for a single ward, the area required to be added with the nurse's duty room is about 40 sft. If it is shared, its size may be slightly larger say, 60 sft.

3.3.3 Clean Utility Room: This room, if provided, may be used for sterilizing basins and instruments, packing surgical dressing drums and clinical laboratory etc. The work to be carried out in this room may be done in the treatment room itself. However, if separate room is desired, the size may be 100 to 120 sft. and placed contiguous to the treatment room.

3.3.4 Treatment Room: Minor treatment including small dressing, injection etc. is carried out in the ward itself. Major dressing and complicated treatments are preferably carried out in the special treatment rooms. Provision of separate treatment room will reduce the risk of cross infection. The patient and the doctor receive the benefit of better facilities and privacy and other patients are not distrubed. Its size may be about 120 sft. The architect may also consider the feasibility of providing a treatment room common to more than one ward. In such instances, the clean utility and treatment rooms may be taken off the ward complex and located at a convenient place in the same floor. The size of such a treatment room together with clean utility room may be 180 to 200 sft.

3.3.5 Ward Kitchen/Pantry: The major function of the ward kitchen is collection and distribution of meals and the preparation of beverages. The kitchen should be equipped with hot water boiler, refrigerator, hot case, and facilities for storing cutleries. An area of 100 to 120 sft. will be required. In a ward unit, the area of pantry, dining and day space may be grouped together.

3.3.6 Stores: Weekly requirements of clothes, bed sheets etc. are drawn from central stores and kept in the immediate vicinity of the ward for day-to-day use. The size of the room may be about 80 sft. Attached to the stores, space may be provided to install lockers for keeping patients' personal articles. The additional area required for this purpose will be about 40 sft.

3.3.7 Dirty Utility Room (Sluice Room): The main jobs done in this room are emptying and cleaning bed pans, urine bottles, and sputum mugs, disposing of used dressing and similar material, storage of stool and urine specimens etc. In several hospitals sluice room forms part of the sanitary unit and is being used for washing and cleaning sheets and blood stained or infected clothes and drying them. Washing and drying blood stained clothes in the sanitary unit is not hygienic. A healthier practice would be, as observed in a few places, to wash the blood stained sheets, etc. in a specified place attached to the laundry before feeding them into the autoclaves or before handing them over to the dhobies. Problems relating to laundering are discussed in Chapter No.11. The size of the sluice room may be 100 to 120 sft.

3.3.8 Bath & W.C: Now-a-days patients are encouraged to leave the bed and more about and in particular to go to w.cs. either on foot or in a wheel chair. If sufficient facilities are provided, probably a good proportion of them would require the use of wash basins w.cs. and day-space. Bath rooms and water closets shall be provided in an adequate proportion as per scales given below:

(i) Urinal	One per 16 beds.
(ii) W.C.	One per 8 beds.
(iii) Bath	One per 8-16 beds.
(iv) Wash basin:	1 per 10 beds excluding wash basins attached to single bed rooms.

This is exclusive of w.cs. provided for the use of patients in single or double bedded rooms.

3.3.9 Janitor's Room: A janitor's room requires a bucket, sink, drainer, locker and space for cleaning of equipment, buckets etc. An area of 60 sft. should suffice.

3.3.10 Sanitary Unit: The size of the sanitary unit consisting of w.cs. bath room, sluice room and cleaner's room shall be about 300 to 350 sft. for ward of 20 to 30 beds.

3.3.11 Day-room: Patients are encouraged to move about at the earliest. It will not be in the interest of the patients and the administration to permit them to leave the ward unit. A place congenial for sitting and relaxing has to be provided in the ward unit itself. It is suggested that the day space may be provided at 15% of the ward capacity with a minimum of 180 sft. per ward. It should afford easy access to patients and supervision by nursing staff and be provided with comfortable chairs, book shelves and small tables. Desirably the day-space may also be used for patients' dining. In planning of ward unit, grouping of ward kitchen pantry and day space should be considered.

The day-space so provided should be of multipurpose use.

3.4 Circulation:

3.4.1 Under this head, circulation space within the ward unit alone is considered. It should be kept as low as possible. A clearance of 4 ft. has been recommended between the beds. Correspondingly the corridor width should not be more than 8'. They should be well lit and ventilated. The overall proportion of circulation space shall not exceed 20% of the total floor area of the ward unit including circulation within.

3.5 Engineering Services:

3.5.1 It is essential that engineering services should be so designed and installed as to ensure ease of maintenance and minimum interruption of services and distrubance to the working of the hospital while repairs are being carried out.

3.5.2 Separate departmental costing is necessary for purposes of budgeting. It,therefore,follows that separate water, gas and electricity meters are installed to know sectional consumption.

3.5.3 Cold Water Supply: Supply of cold water through pipes should be available in kitchen, dining area, sanitary units and treatment room. A drinking water-point tapped from the mains should be provided in the kitchen. Where filtered water is used for washing and drinking, separate drinking water-point will not be required.

3.5.4 Hot Water Supply: Supply of hot water should be available for bathing. The comparative economies should be worked out to see whether central supply through pipes or local preparation with the aid of boilers or stoves, would be cheaper. Our experience has been that central supply is generally expensive.

3.5.5 Gas: In certain cities public supply of gas is available and it is likely to be introduced more and more in other cities also. Where gas is available, piped gas should be provided in kitchen, treatment, testing and sterilising areas.

3.5.6 Electrical Installation: The electrical installation in the ward unit will include wiring and equipment for general and special lighting, socket outlets, bedhead units, ventilating, telephones, clock and call systems. The electrical supply may be provided by a sub-main circuit from the main intake and distribution centre. Local distribution boards should be placed to reduce the length of circuit-wiring. Control boards should be near the nures's duty room and effectively protected from unauthorised interference and at the same time easily accessible from the corridor. Conduits and cables should generally be concealed, service ducts being provided wherever practicable.

Hospitals with more than 500 beds can be equippod with a generator of suitable capacity to meet their need during emergency and breakdowns.

So far it was a practice to connect operation theatres and a few essential points to such a stand-by generator. We, however, recommend that one of the bed lifts may also be connected to this generator to safe-guard against failure of electricity. This arrangement will dispense with the necessity of ramps.

3.5.7 Lighting: Lighting of wards and treatment sections require careful designing. Lighting which is intended for illuminating the central part of the ward should not produce glare. This can be achieved through fluorescent lamp fittings with downward louvres.

Night lights of low voltage should also be provided in the centre which can be used when fluarescent lamps are put off. The provision of bed-head lights for patients' reading and writing is not in vogue. Beds in single-bed rooms must be provided with bed-head lights. In the other sections it can be introduced progressively.

Corridor light fittings should be embedded almost flush with surface. Lighting in treatment room will vary with medical requirement; but generally there should be a wall or ceiling - mounted adjustable spot light.

3.5.8 Patient Call System: The bed side switch board should contain a bell push for inviting the attention of the nurse.

3.5.9 Telephone: Telephone facilities for internal and external calls for the ward unit from part of the hospital telephone system and will normally be provided with the doctor's, sister's and nurse's stations.

3.5.10 The following table gives the intensity of lighting and socket outlets to be provided in various areas of the ward unit as recommended by the Ministry of Health, London.

A. Lighting:

S.No.	Location	Average lumens per sft. recommended at working level.
1.	General Ward Lighting	3*
2.	Minimum in centre of ward.	10
3.	Bed-head lighting, Nurse's Station, Day Space.	15
4.	Treatment Rooms	20
5.	Sister's and Doctor's Room.	15
6.	Ward Kitchen	10
7.	Sluice Room	7
8.	Bath Rooms and Lavatories	5
9.	Cleaner's Rooms, Corridors and Staircases.	5
10.	Waiting Rooms.	7

* The standard given is required at floor level.

B. Socket Outlets

S.No.	Location	Number
1.	Ward	1 for two beds.
2.	Treatment Room	2
3.	Nurse's Station	2
4.	Doctor's/Sister's Room	2
5.	Day Room/Dining Room	2
6.	Clean Utility Room	1
7.	Dirty Utility Room	1
8.	Corridor	1

3.6 Summary of Space Requirements:

3.6.1 Based on the analysis exhibited in plate No.2, The summary of space requirements of different types of wards is listed in Statement 'A' appended to this Chapter.

3.6.2 It can be seen from Statement 'A' that the types fall under different categories namely, (i) 'Nightingale', (ii) 'Rigs' and (iii) 'Nightingale' cum-'Rigs'.

3.6.3 In the case of cubicalised wards, we are of the opinion, that generally three bed-deep cubicles will be satisfactory from the point of view of lighting. However, four-bed-deep design may be followed in places where it is possible to utilize day lighting, with proper orientation. The design

of wards should be such that it fits the module of the structure.

3.8 Special Types of Wards: Apart from the normal medical and surgical wards, there are wards for specific diseases, the requirements of which are slightly different

3.8.1 Eye Wards: In planning the ward for the 'Eye' department, primary consideration should be to avoid glare. This can be achieved in arranging the beds suitably (parallel to the longitudinal wall) and proportioning the extent of light incidence at bed levels by careful proportioning and positioning of the windows and proper orientation of the ward itself.

The windows may be provided with curtains for convenience of controlling natural light at will. Where glass panels are used, they may be painted with pleasing colours like light green or light blue. Similarly the internal faces of walls may also be painted with pleasing colours (generally light green) which will be soothing to the eyes.

Each ward, must have a cubicle which can be darkened at will with two to three beds, specifically intended for post-operative management of detachment retina cases.

The requirements of natural light being limited, planning of ward units with central corridor is advantageous.

The principal and ancillary accommodations will be similar to medical or surgical wards.

3.8.2 Infectious Diseases Wards: The principal and ancillary, accommodation will be similar to any other surgical or medical ward. Wherever separate Infectious Desease Hospitals exist, the general hospital need have only a limited number of beds allocated for infectious disease patients say 1% to 2% of the total number of beds. Where such hospitals are not in existence, the size of the unit may be larger to accommodate 3% to 5% of the total number of beds.

Infectious disease wards should be divided into cubicles, with toilet facilities, so that patients could be segregated deasese-wise and sex-wise.

Siting: Infectious Diseases Wards are required to be separated from the rest of the hospital. It will be a separate building located at a reasonable distance which will not involve problems of communication from the service areas of the main hospital. Separation can also be effected by providing an air-gap between the infectious ward and other hospital facilities.

3.8.3 Maternity Wards: Maternity units might contain wards where the patients' beds would also have babies' cradles attached. The cradles should be on the side of the patients bed and not at the end of the bed. The distance between bed centres in this case should be 8'. Ancillary accommodation will be similar to other wards. The comprehensive list of physical facilities required in the Maternity Department are dealt with separately in Chapter No.8.

3.8.4 Children's Ward Unit: Design of children ward unit is more involved and therefore requires considerable thought. The requirements are based on considerations which do not apply to other sections.

The physical facilities will include the following:

A) Principal Accommodation

Ward

(i) Pavilion Type
(ii) Cubical Type

B) Ancillary Accommodation

(i) Nurse's Station
(ii) Clean Utility Room
(iii) Treatment Room
(iv) Kitchen/Pantry
(v) Day Space-cum-play Space.
(vi) Stores
(vii) Sanitary Unit
(viii) Dirty Utility Room

C) Auxiliary Accommodation:

(i) Mothers' Halting and Change Room
(ii) Mothers' Bath and W.Closet.
(iii) Mothers' Dining
(iv) Lecture Room for Health Education
(v) Doctors Room (optional)

A. Principal Accommodation:

Wards: Since the risk of cross infection is greater with children, it is desirable to segregate patients with infectious diseases from other patients. The non-infectious may be accommodated in a pavilion type of ward. The children beds are smaller in size and hence require less of ward width. The bed centres may be kept at 6'-6" and the width of the ward may be about 16'-0" for two rows

of beds placed parallel to the longitudinal well. Area per bed in this case will be 50-55 sft.

B. Ancillary Accommodation: Space required for nurse's station, kitchen/pantry, treatment room and stores will be similar to other wards. Treatment room is essential since child patients make noise even for a minor dressing or treatment.

The sanitary unit will contain special small size sanitary fittings, w.c. pans, bath tubs, wash basins etc.

C. C. Auxiliary Accommodation:

Mothers' Halting Room: The nursing care required by children is much more than in the case of adults. It is at present quite necessary and desirable to permit the mothers to stay on with the patients who would assist the nurse in looking after their children.

It is medically inadvisable and physically impracticable for the mothers to stay all the time by the bed side of the patients. Adequate facilities should, therefore be provided for their sleeping, changing, bathing, dining and resting. The accommodation will be in the form of ward cubicle(s) with 4 to 8 beds. Separate sanitary unit should be provided for their convenience. It will not be in the interest of the patients to permit the mothers to dine by the bed side of the patients.

Again the flow of traffic between the wards and mothers' unit should not foul with the movement of medical personnel. Visitors, attending the hospital to meet the mothers, bringing food

for them, should be able to approach the mothers' unit without going through the ward or the corridor intended for the medical personnel.

Lecture Room for Health Education: The mothers may be given instructions on "mothers' responsibilities" towards children care, elementary hygiene and preventive care. The space required will be about 300 sft. This procedure, apart from being instructive, is a healthy diversion.

Doctor's Room: In conjuction with the nurse's station, a room may be provided for doctor. The size of the room may be 120 sft.

3.8.5 Special Ward: In a general hospital a few single-bed rooms may be provided under this category. Occupation of these wards may be charged for. Since nursing costs will be comparatively higher, the extent of such wards should be limited to vie with the financial resources and availability of nursing personnel. These wards are provided in addition to the single or double bedded rooms attached to the general wards.

This will be, in its character, a nursing home with single, double and four-bedded wards. The special ward unit may be a separate wing but capable of receiving quick services from the central service units. The number of beds in the special ward unit may be between 5% and 10%.

Physical Facilities: The special wards may include single, double and four bedded rooms. Where there is a ward with 24 beds, it may consist of 8 single bedded rooms, 4 double bedded rooms and 2 four bedded

rooms.

The size of the single bedded room can be 120 sft. double bedded room 160 sft. and four bedded room about 28 sft.

All single bedded rooms must be provided with individual w.cs. Double and four bedded rooms can be grouped to share lavatory facilities.

Whether we like it or not, the relatives generally like to stay with the patients in the ward premises. Modern 'nursing-homes' in our country do not permit over-night stay of relatives except in special circumstances. This practice must be insisted upon in public hospitals also. If it is considered inescapable, two rest rooms with lavatory conveniences may be provided to serve men and women separately in the ward unit itself. These rooms will be attached with independent lavatory facilities. The size of the rooms may be 180 sft. each.

We feel that accommodation for relatives who come from out stations to attend on the patient should be provided out side but close to the hospital campus. This can be called as 'Relatives Lodge' and should be on a modest scale, say a few rooms with kitchen and sanitary facilities. It should be maintained by the hospital administration and charges levied for its use, on no-profit no-loss basis.

Ancillary accommodation will include nurse's station, treatment/clean utility room, kitchen/pantry, stores, sanitary unit, sluice/dirty utility room and a visitors' lounge.

The ward may have a corridor with principal accommodation on one side and ancillary accommodation on the opposite side.

If it is housed in one floor of a multistoreyed building, it should be provided with lifts for the convenience of moving patients to and from diagnostic and treatment areas including operation theatres.

The design will not permit direct supervision by nurse. It will, therefore, be necessary to provide facilities for the calling of nurse by the patients either by a call bell or light indicator system.

3.9.1 Convalescent Homes: At present practically no city has convalescent houses attached to any hospital which can accommodate patients who require hospitalization but little nursing care. Patients suffering from chronic rheumatism, malnutrition, anaemia, joint tuberculosis etc., if continued to be accommodated in a general hospital, will effect adversely the turn over of beds. Such cases after initial treatment can be kept in canvalescent homes. In big cities these homes may be common to more than one hospital. They require a skeleton staff only.

The physical facilities and their space requirements will be similar to general wards but

construction may be simple. The number of beds in a ward unit can be as much as sixty so as to ensure greater use of ancillary facilities. Such a unit may be divided into smaller sections and provided with liberal sanitary facilities say 1 to 1.5 times of ISI standards as convalescent patients are likely to use them more than other hospital patients. The Panel had an occasion to visit one such home in Trivandrum which had been constructed at a cost of Rs.8/- per sft. of plinth area. This is commendable. Prefabricated construction may offer an acceptable solution for putting up such cottages.

3.9.2 Location: In district headquarters, convalescent homes may be placed within the hospital or outside the city but within easy reach of the public. In larger cities, they may be advisedly located little away from the city at a distance which will not be found inconvenient by the relatives of the patients.

It will be advantageous if every hospital with more than 500 beds makes a provision of convalescent wards in the hospital campus itself, if it is not feasible to establish a convalescent home outside the hospital.

PLATE NO. 2
Para No. 3.1.6.

LAY OUT STUDY OF WARDS

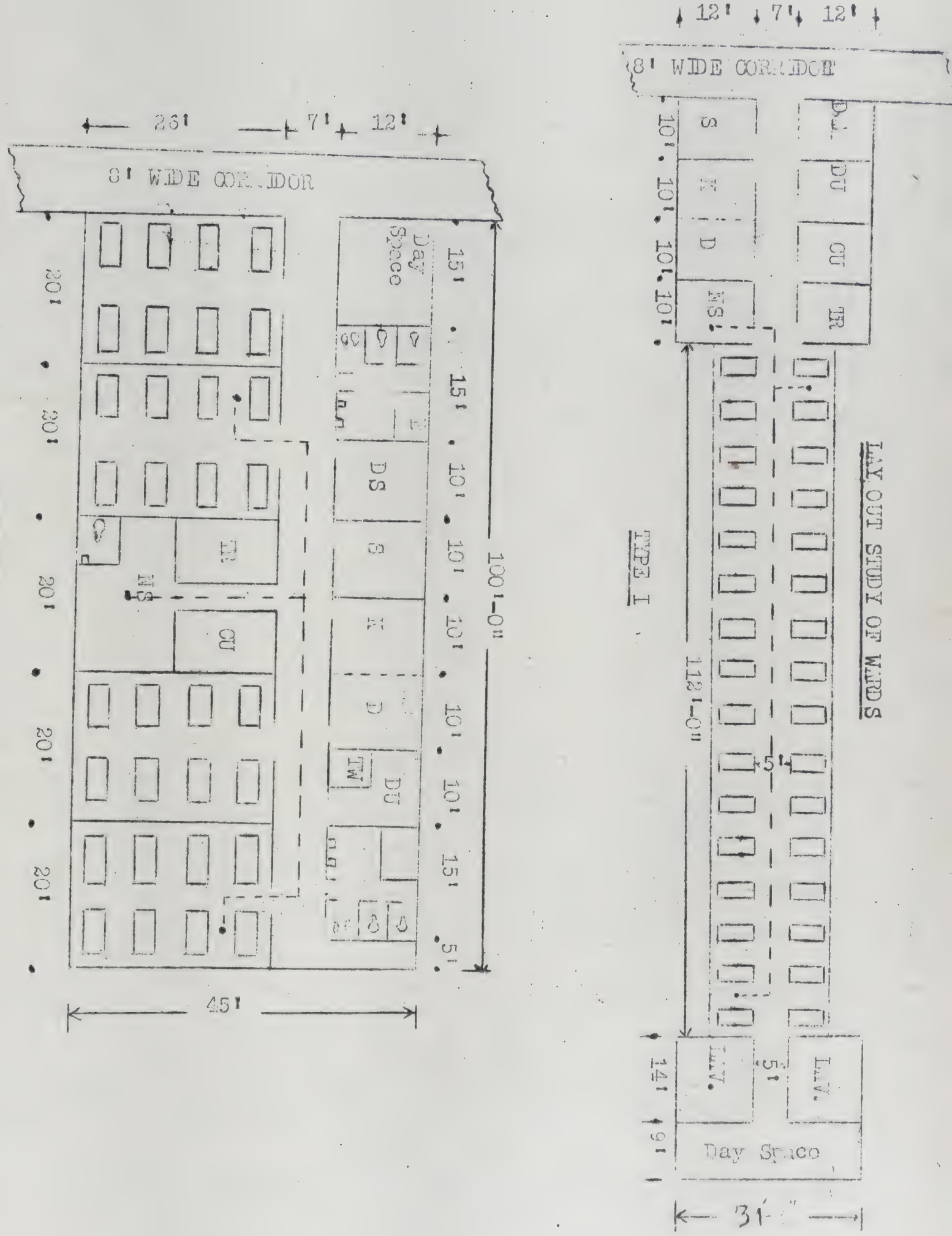
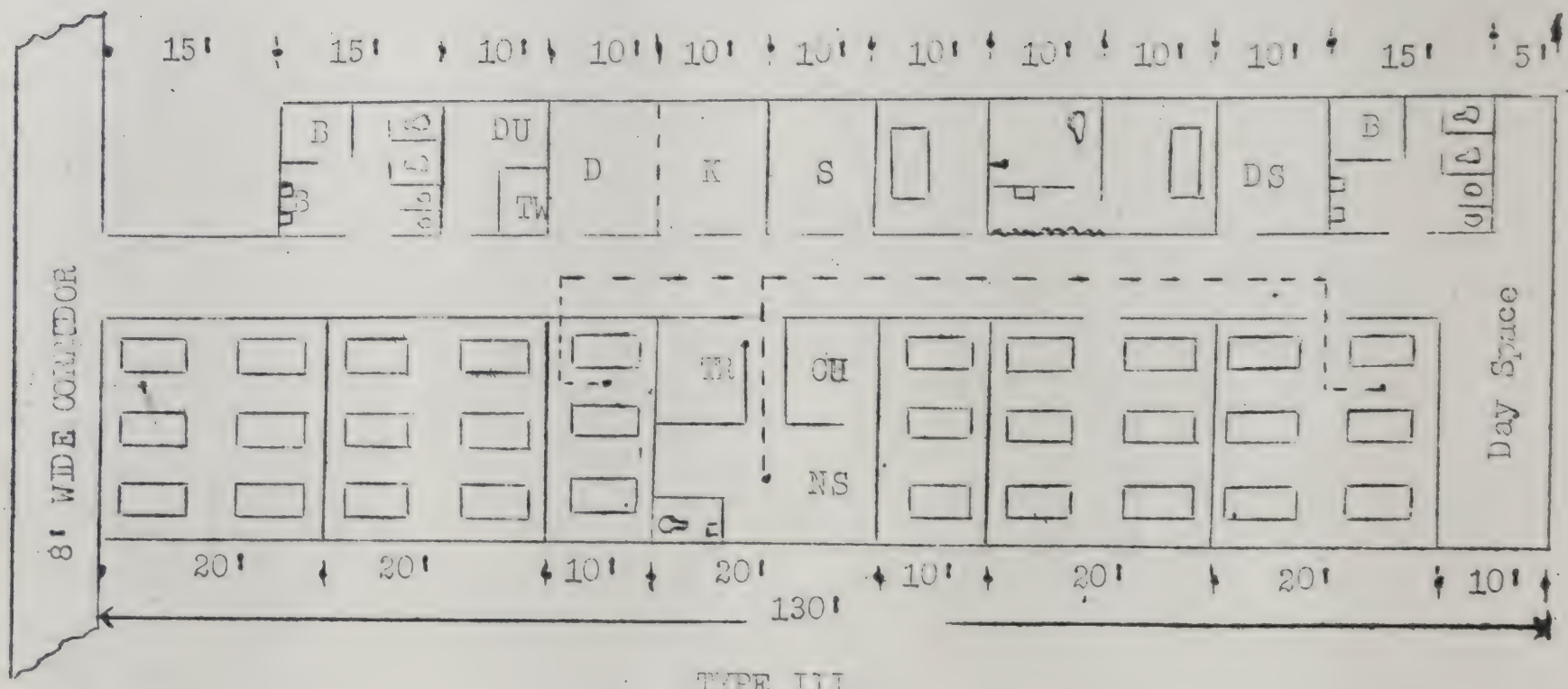
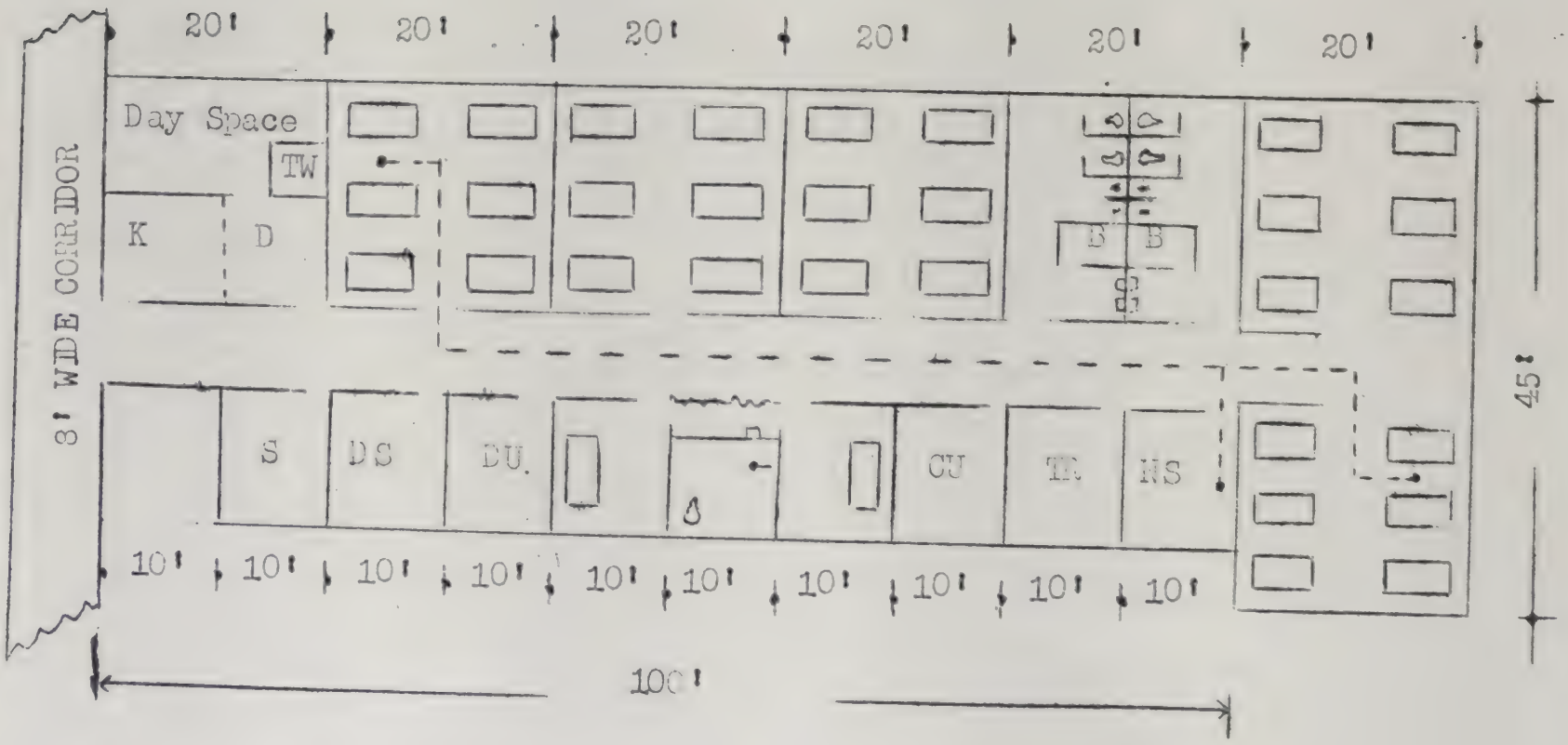


PLATE NO.2

LAY OUT STUDY OF WARDS (Contd.)



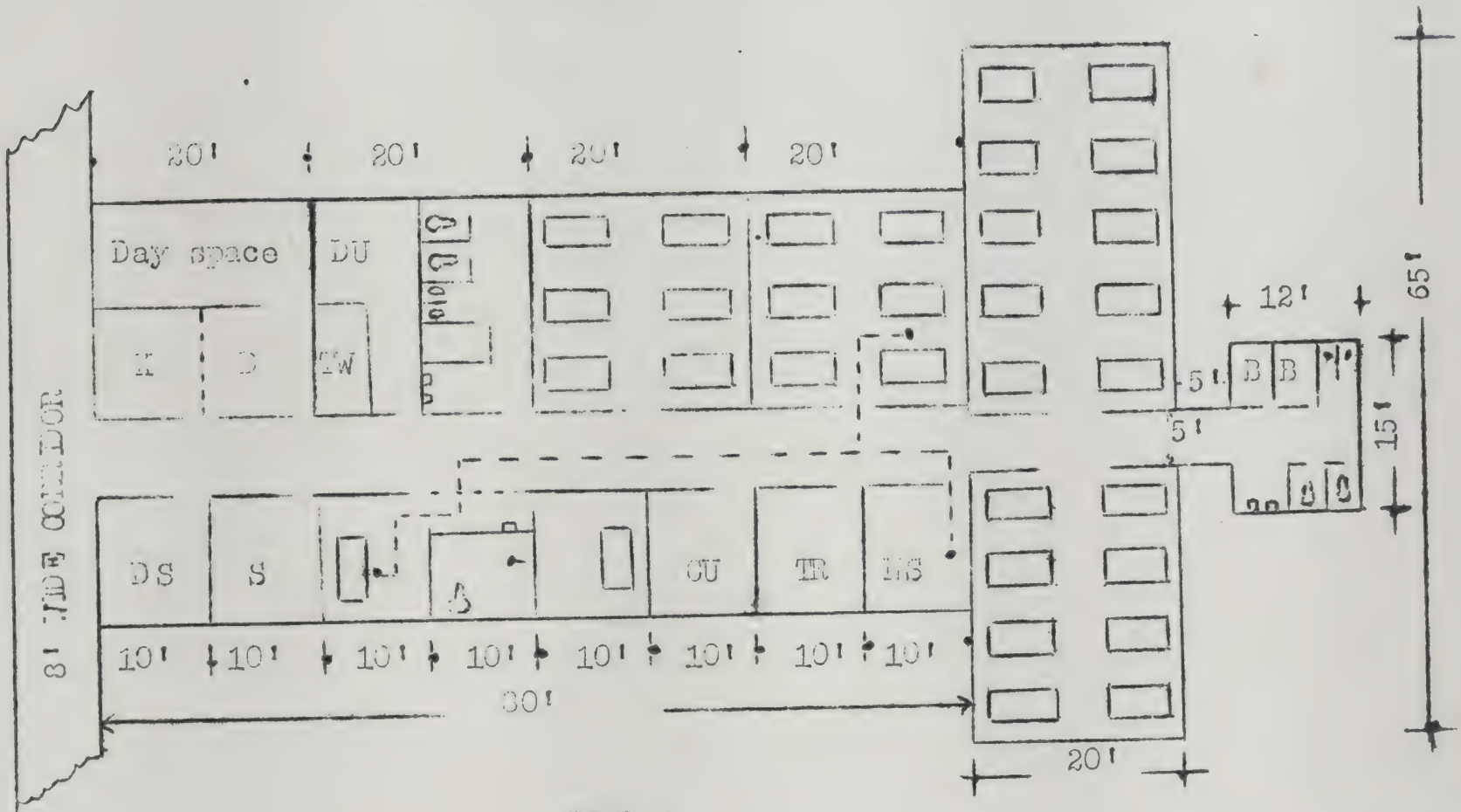
TYPE III



TYPE IV

PLATE NO.2

BLOCK OF WARDS (Contd.)



TYPE V

ABBREVIATIONS

Nurses' Station	NS
Doctor-cum-Sister's Room	DS
Treatment Room	TR
Clean Utility Room	CU
Dirt Utility Room	DU
Store Room	S
Kitchen	K
Dining Room	D
Bath	B

LAY OUT STUDY OF WARDS

STATEMENT - A
(Para 3.1.2, 3.6.1, 3.6.2

Facilities	Type 1	Type 2	Type 3	Type 4	Type 5
Bed Area					
i) Nightingale	2240 Sft.	-	-	900 Sft.	1220 Sft.
ii) Rigs	-	2080 Sft.	2000 Sft.	1200 Sft.	800 Sft.
iii) Single bed	-	-	240 Sft.	240 Sft.	240 Sft.
Ancillaries					
i) Nurse's Station	120 Sft.	260 Sft.	200 Sft.	120 Sft.	120 Sft.
ii) Doctor-cum-Sister's Room	120 Sft.	120 Sft.	120 Sft.	120 Sft.	120 Sft.
iii) Treatment Room.	120 Sft.	104 Sft.	80 Sft.	120 Sft.	120 Sft.
iv) Clean Utility Room.	120 Sft.	104 Sft.	80 Sft.	120 Sft.	120 Sft.
v) Dirty Utility Room.	120 Sft.	120 Sft.	120 Sft.	120 Sft.	200 Sft.
vi) Store Room	120 Sft.	120 Sft.	120 Sft.	120 Sft.	120 Sft.
vii) Kitchen	120 Sft.	120 Sft.	120 Sft.	100 Sft.	100 Sft.
viii) Dining Room.	120 Sft.	120 Sft.	120 Sft.	100 Sft.	100 Sft.
Sanitary					
W.C. & Lavatory	336 Sft.	360 Sft.	330 Sft.	520 Sft.	500 Sft.
Horizontal circulation	350 Sft.	760 Sft.	970 Sft.	700 Sft.	685 Sft.
Day Space	261 Sft.	180 Sft.	200 Sft.	200 Sft.	200 Sft.
Total Floor Area	4147 Sft.	4448 Sft.	4730 Sft.	4630 Sft.	4645 Sft.
Floor area per bed.	130 Sft.	139 Sft.	148 Sft.	146 Sft.	145 Sft.
Average Walking Distance.	73 ft.	68 ft.	68 ft.	68 ft.	53 ft.
Linear Density	0.173	0.320	0.246	0.267	0.274

4. RADIOLOGY DEPARTMENT

4.1 Introduction

4.1.1 The Radiology Department includes the x-ray, diagnostic and therapy units. The diagnostic unit deals with radiography and fluoroscopy; the former is a photographic device and the latter a screening device where the object is directly seen through the medium of x-ray. The therapy unit includes treatment of varying intensities ranging from superficial therapy to cobalt therapy.

4.1.2 The size of the department depends upon the load, the scope of work and the type of equipment employed. Radiography is a fast developing technique. Modern equipment is capable of making use of films of smaller size. Since equipment is increasingly used for radiography and screening, such developments call for a more flexible design of facilities.

4.2 Location:

4.2.1 X-ray is one of the services which is common to both the in-patient and out-patient departments. Since frequent use is made of this service in the O.P.D., where screening is a matter of routine, it could be advantageously located between this department and the nursing units but nearer to the former, to avoid disturbance to the nursing units.

4.2.2 As the department deals with high voltages, presence of moisture in the area should be avoided. Therefore the basement is the most unsuitable location and must be precluded.

Radiography

4.3 Radiography: The facilities required are as follows:

(a) Room for the chief of the unit (Radiologist)
(b) Film Storage
(c) Patients waiting
(d) Registration counter
(e) Radiographic units.
(f) Dark room
(g) Film drying area
(h) Film developing area 80 sft.
(i) Barium meal preparation and Injection.
(j) Janitor room
(k) Toilet.

4.3.1 Chief of the Unit: In large hospitals the department is placed under the charge of a specialist. He needs a specious room where he engages himself with the study of films and holding discussion with other specialists. Adequate number of viewing boxes are essential. The size of the room may be 150 to 200 sft.

4.3.2 Film Storage: The cupboards containing films may be conveniently placed in the Chief's room. Built-in cupboards will be handy.

4.3.3 Patients Waiting Hall: In hospitals upto 500 beds, waiting halls need not be elaborately planned. One hall may be so planned as to serve patients waiting before and after registration. This is easily managed since the number of units will not generally exceed two. In larger hospitals it may be necessary to duplicate units and the waiting room in order to cope with the load of work. The size of the hall may vary from 150 to 300 sft.

4.3.4 Registration Counter: Where radiology forms a full-fledged department, an independent registering section is essential, the size of the counter should be

sufficient to accommodate a clerk's seat and record chests. It may be 80 to 100 sft. and juxtaposed to the waiting hall. The counter should not open into a corridor as it will lead to crowding and obstruction to the flow of traffic.

4.3.5 Radiographic Units: Theatres may consist of any one of the following equipment and the number of rooms could be one or more depending on the size of the hospital.

i) 50 M.A. Unit,
ii) 100 M.A. Unit,
iii) 200 M.A. Unit, and
iv) 500 M.A. Unit

Provision should also be made for a pair of dressing cubicles. The size of the rooms for 100 M.A. and 200 M.A. units may be 150 sft. and 400 sft. for 500 M.A. unit.

4.3.6 Dark Room: Development of films pertaining to the radiology department is carried out in the department itself. The dark room may be located in between a pair of x-ray rooms so that new and exposed films could be easily passed through hatch windows between the rooms and the dark room. The size of the dark room need not be more than 100 sft. It should be completely cut off from direct light. For ventilation, it is essential to provide exhaust fans in the dark room.

4.3.7 Film Drying: Atmospheric drying is generally resorted to. This is however, time consuming, the Panel had come across mechanical contrivances in the form of hot chambers. One such improvisation is steel cupboard fitted with a network of heating elements at top and an

exhaust fan at the bottom, films being suspended in between. This contrivance enables circulation of hot air. and a set of films is dried in less than 15 minutes. Consequently space required for drying films is much less i.e. 80 to 100 sft.

4.3.8 Film Development Area: A separate place should be allocated adjacent to the x-ray department for the purpose of developing x-ray films. The location should be such that it serves all the department of O.P.D.

4.3.9 Barium Meal & Injection: Small rooms of size 100 to 120 sft. each may be provided for the preparation of barium meal and for injection in large hospitals.

4.3.10 Janitor Room: Space for janitor should be provided in the form of an alcove. An area of 60 sft. would suffice.

4.3.11 Toilet: Toilets, separately for both sexes, should be provided in the complex of the department.

4.3.12 General: Apart from the above facilities, there should be one common room for the other doctors and one retiring room for doctor or technician on night duty. In case of small hospital, a single room is enough for this purpose.

Taking into account the movement of wheal chairs and stretchers, the width of the corridors and verandahs of this department should not be less than 7'.

4.4 Radio Therapy: This may include the following treatments listed in the order of capacity for penetration.

(i)	Infra x-ray therapy	(15-25 KV)
(ii)	Contact therapy	(50 KV)
(iii)	Superficial therapy	(10-18 KV)
(iv)	Intermediary therapy	(80-160 KV)
(v)	Convergent therapy	(160-300 KV)
(vi)	Rotation deep therapy	(160-300 KV)
(vii)	Cobalt therapy.	

4.4.1 Apparatus for infra x-ray and contact therapy is of simple character and be generally provided in small hospitals. The apparatus occupies little space and requires no elaborate precautions. The departments of dermatology, gynaecology, ottorpy-nolaryngology and ophthalmology make use of this apparatus.

4.4.2 Superficial therapy and intermediary therapy are generally provided in medium size hospitals. The equipment require special rooms capable of preventing escape of radiation.

4.4.3 Deep and cobalt therapy equipment is provided only in large hospitals. They require rooms of still higher order of protection against radiation. The protective measures consist of thick walls, floors and ceiling. These, therefore, are best located in the lower floor.

4.4.4 Facilities: The x-ray therapy department will include patients waiting room (s) physician's room(s), therapy room(s) with control room(s) and toilet units.

4.4.5 Each therapy room should have adequate space for accommodating the therapy apparatus, the high voltage generator control desk and dressing cubicle for the patients.

4.4.6 Contact therapy room will include the apparatus, bed and dressing cubicle within. The size of the room may be 120 sft.

4.4.7 Superficial and intermediary therapy rooms will include the apparatus and a bed. Control desk and dressing cubicle are provided outside the influence of radiation. The size of the rooms may be 150 sft. for the equipment and treatment; and 50 sft. for control desk and dressing.

4.4.8 Deep therapy rooms will be designed functionally similar to superficial and intermediary therapy rooms. Since intensity of radiation is relatively high and penetration is deep, strong protection is required. The size of the room may be 200 sft.

4.4.9 Cobalt therapy involves deeper penetration and greater radiation and requires protection of still higher order. The size of the room may be 300 sft.

4.4.10 Control rooms and dressing cubicles are placed between the therapy rooms. The size of the control room may be 80 to 100 sft.

4.4.11 Structure: The design of stracture should be such as to prevent the escape of radiation. The thickness of walls, floors and ceilings has to vary with the intensity of radiation. For superficial and intermediary therapy rooms, 13½" thick walls and 6" thick R.C.C. roof will be adequate. They may be painted with lead borne paints. For deep and cobalt therapy rooms, the walls and ceiling should be of R.C.C. 12" to 14" thick.

Doors should also be made radiation proof. Lead clad or lined steel doors, either hinged or sliding should be provided.

For the x-ray and fluoroscopic installations, the specifications laid down by the Atomic Energy commission may be adopted.

4.4.12 Waiting Room: Waiting rooms, one for each sex, of size 100 to 150 sft. may be provided in the complex of the therapy department. They may also be provided with toilet facilities.

4.4.13 Office: The specialist in charge of the department should be provided with a room of size about 150 sft. The staff of the department should also be provided with a room of size 150 sft. A toilet for the physician and the staff is a necessity.

4.5 Mobile X-ray Unit:

4.5.1 In large hospitals x-ray facilities are required additionally in the emergency, orthopaedic, dental, and operating departments. In these departments the equipment may be of mobile type. The extent of

x-ray facilities required for different grades of hospitals is discussed in Chapter No. 13.

5. DEPARTMENT OF PHYSICAL MEDICINE

5.1 Introduction

5.1.1 The department of physical medicine covers physical and occupational therapies. Whether physical therapy and occupational therapy should be separate or combined, has been a controversial subject. However, it is at present recognised that physical therapy, physical medicine, rehabilitation and occupational therapy, are very closely related and must be placed under the charge of one individual.

5.2 Location:

5.2.1 The physical therapy section of the department is more frequented by out-patients and the occupational therapy by bed ridden patients. The department, as a whole, therefore, should be placed accessible equally to out and in-patients.

5.3 Physical Therapy:

5.3.1 This field of treatment is gaining greater recognition and is likely to be introduced in greater number of hospitals in the future. There is need for establishing space standards for this department as well.

5.4 Electro Therapy:

5.4.1 Physical therapy comprises electro therapy, hydro therapy and exercise (Gymnasium). The nature treatment and the equipment employed are several in kind. To mention a few, they are shortwave dia therapy unit, radiant heat lamps, aromayer lamp,

wax unit, high frequency machine, vibrator, ultra sonic therapy unit, unit for testing electrical reactions etc. All these facilities are not provided in all grades of hospitals. The scale depends upon the bed-strength of the hospitals.

5.4.2 Physical therapy demands complete privacy. Only one patient can be attended to at a time. Accommodation may, therefore, be provided in the form of booths. A long room provided with curtains which could be drawn to form cubicles and afford adequate privacy would be suitable.

5.4.3 Area per booth including space for equipment may be 80 sft. (say 10' x 8').

5.5 Hydro Therapy:

5.5.1 All general hospitals above 200 beds provide facilities for hydro therapy. Hospitals with less than 500 beds provide a small tank and bigger hospitals provide a swimming pool in addition. There should be arrangements to fill (whenever necessary), small tanks with hot water, to enable treatment of patient suffering from polio, rheumatoid asthesistics and stiff joints.

5.6 Gymnasium:

5.6.1 A large hall of size varying from 400 to 800 sft. is necessary for group exercise and walking exercise including parallel bars, pulleys, wall bars, ladders etc. It may be oblong in shape, containing a wall bars fixed to one of the long walls. Mirror arrangement is necessary for correcting walking disabilities. These facilities also are provided only

in larger hospitals.

5.7 Rehabilitation Therapy:

5.7.1 A variety of gadgets and articles which patients use in daily life constitute the requirements of rehabilitation therapy. They may include:

(a) bath
(b) toilet
(c) dressing section
(d) stairs with railings
(e) model of a car to train the patients to get in and out of vehicles
(f) equipments like typewriter, sewing machine with ancillaries and kitchen articles
(g) a bicycle and so on.

for the training of hands etc.

5.7.2 The size of the hall may vary from 400 sft. to 800 sft. These facilities are provided in hospitals with 500 beds and above.

5.8 Specifications:

5.8.1 The halls intended for exercise and occupational therapy should be well lighted and ventilated and should present a pleasing appearance. The floor must be skid proof. In many cases a skid-proof matting is provided.

5.9 Offices

5.9.1 The physio therapist must have an office room for himself where patients may be interviewed and examined. In addition there must be another room where one or two clerks can carry out office and maintain clinical records of patients. A room of size varying from 200 to 300 sft. with suitable partitions is adequate.

5.10 Stores:

5.10.1 Articles, and electrical equipement which are not in use have to be stored, the size of the room may vary from 200 to 500 sft.

5.11 Toilet:

5.11.1 Hand washing facilities for therapists are essential. Toilet facilities both for staff and patients should be provided in adequate proportions for both sexes.

5.12 Dressing cubicles:

5.12.1 Dressing cubicles are a must in this department. Depending upon the size of the department, they should be provided for both sexes.

5.13 Waiting hall:

5.13.1 Patients awaiting treatment and requiring relaxation after treatment, need waiting accommodation. The size of the hall may vary from 200 to 400 sft.

5.13.2 Provisions of canteen is necessary in large hospitals but there should be only one canteen for O.P.D. and the main hospital.

5.14 Workshop: Repairs to equipment and other gadgets can be carried out in the central workshop of the hospital.

6. THE OPERATION DEPARTMENT

6.1 Introduction

6.1.1 The operating department is the most important of surgical facilities. Yet in many cases, we have observed that sufficient thought has not been given to proper proportioning and planning of its components. There prevails wide variation in the number, size and location of the operating suites. In some of the large hospitals, a few units are allocated to neurology, urology etc. and other units to general surgery. In such cases, the use coefficient of the theatres of the letter category was low as compared to that of the theatres shared by more departments. It is obvious that optimum utilisation of the operating units is possible only if theatres, as a rule, are not reserved rigidly for use by a particular department. The operation theatres should further be similar in design and character to make it easy for all surgeons to use them without the necessity of familiarising themselves every time with a new set of conditions.

6.1.2 A problem in multi-storey hospitals is the location and distribution of theatres between the floors. We are expressing our views on the aspect later.

6.2 Physical Facilities: The operating department consists of the following parts:

6.2.1 Principal Accommodation:

i) Operating room(s).
ii) Anaesthesia room
iii) Scrub room
iv) Sub-sterilizing room

6.2.2 Ancillary Accommodation:

i) Anaesthetist room
ii) Anaesthesia storage and equipment room.
iii) Instrument room.
iv) Sterilizing room.
v) Doctor's room and toilet.
vi) Nurses' room and toilet.
vii) Sister's room and toilet
viii) Stretcher bay.
ix) Pre-operative room
x) Recovery ward.
xi) Post-operative ward
xii) Relatives waiting area with toilet
xiii) Pantry
xiv) Air-conditioning plant room
xv) Switch room.

6.3 The degree of utility of these facilities depends upon their size, location and grouping; and these aspects are discussed below:

6.3.1 Location: Location of operating department is a matter for detailed consideration. It should ensure quietness, free from disturbances and close to the surgical wards. Corridor leading to this unit should not be planned as thorough passages. In one of the plans reviewed by the Team, the operating department has been located, placing the theatres on either side of a corridor connecting the public area (office, laboratory etc.) and the out-patient department. It is obviously an unsuitable arrangement.

6.3.2 Grouping: In small hospitals which are generally of single or double storey construction, the operating department can be placed on one floor. In large hospitals, the grouping will depend upon the number of theatres. If it is not more than six, all of them can be placed on one floor which may be either on intermediate floor or the top floor. This facilitates the work of the Sister who is incharged of the department and better utilisation of supporting facilities. If the number of theatre units is more than six, it becomes necessary to distribute them between two or more floors. In such cases it is recommended that the theatres and the corresponding wards should, as far as possible, be placed on the same floor so as to minimise the vertical movement and consequently the use of elevators which is not liked by the patients especially on their way back to the wards.

The theatres may be grouped in pairs, placing the sterilizing and scrubbing rooms in between. This arrangement has been accepted as very convenient. A type plan of a theatre suite with two theatre units is given in Plate No.3.

6.3.3 Zoning: A high degree of asepsis is necessary in all areas connected with surgical operations. This

cannot be achieved if the patients and the equipment have to pass through long corridors and other unprotected areas. Zoning is therefore, necessary to keep the theatres free from microorganisms as best as possible. It is in such matters, that the architect's ingenuity is required.

There might be three well defined zones:

(i) 'Aseptic Zone': This consists of theatres, anaesthetic and sterilizing rooms. Here, the highest degree of antibacterial precautions are a must.

(ii) 'Clean Zone': This includes the reception and recovery wards, the offices, the instrument store etc. In this area, only sterile instruments are used. Walls, floors, beds and equipment are to be kept absolutely clean.

(iii) 'Disposal or Dirty Zone': The soiled instruments and dressings are transacted through this area for washing and resterilization or disposal. It includes the sluice rooms and disposal corridor. There should be no communication whatsoever between the disposal and the area except the hatch or door through which material is passed from the theatre.

6.3.4 Orientation: In the past, the primary consideration for orientation had been to ensure adequate day light within the theatres without glare. Northern light was considered most suitable. The position today is different as the operations are conducted under artificial light of suitable intensity. We, however, feel that north

orientation for operation theatres should not be entirely ruled out and should continue even now, in view of the possibility of interruption of electric supply. An automatic standby plant is also essential to provide for power failure.

6.4 Number and Size of Theatres:

6.4.1 The number of theatres required in a hospital is related to the number of available surgical beds and the extent of specialist facilities like neurology, thorasic surgery, E.N.T., urology etc. We recommend the following scale of theatre units for hospitals with different bed strengths:

S.No.	Total No. of beds	No. of theatre units			
		Main Operating Deptt.		O.P.D.	
		Major	Minor	Major	Minor
1.	25	1	-	-	1
2.	50	1	-	-	1
3.	75	1	1	-	1
4.	100	1	1	-	1
5.	300	3	1	-	1
6.	500	5	2	1	1
7.	750	8	2	1	1
8.	1000	10	2	1	1

We have come across theatres of size varying from 16' X 16' (256 sft) to 24' X 32' (768 sft.) and in exceptional case to 968 sft. It is very necessary to limit the size of the theatres to just what is functionally essential. Large sizes give rise to problems of air-conditioning, cleaning, washing etc. Based on our studies, we consider that the size of the theatres should be either 18' X 18' or 20' X 18' and in any case not more than 20' X 20' except in the case of theatres provided with viewing gallaries where the size may be 24' X 24'. Functionally, non-teaching hospitals do not require theatres with viewing gallaries.

6.4.2 Though the nature of work carried out in major and minor theatres differ by and large, it is not worth making small variation in their sizes. This arrangement will offer flexibility in their use and present familiar surrounding. We, therefore, recommend that the design of both major and minor theatres may fall into the category of size either 18' X 18' or 20' X 18'.

6.4.3 The orthopaedic theatre should have mobile X-Ray unit with dark room attached to it. There may also be, in the suite, a fracture room of 200 to 240 sft. and a plaster room of 80 sft.

6.4.4 In large hospitals it will be advantageous to provide piped oxygen and suction arrangements in the operating department.

6.4.5 Scrub-up: A minimum of two sinks should be provided in each room. Glazed openings may be provided in between operating and scrub rooms, to enable the surgeons and nurses to keep watch over the patient, Its size may be 80 to 100 sft.

6.4.6 Sub-sterilizing Room: The modern practice is to receive the bulk of the supplies like gloves, syringes, pack, dressings etc. from the C.S.S.D. and the Instrument Supply Department located in the theatre complex. As such, sterilization in the unit attached to the operating unit is limited to operating instruments on an emergency basis only. They are equipped with high pressure, quick sterilizing apparatus. In highly developed unit, instruments are washed and sterilized in a double ended autoclave which forms the only communication between sterile and non-sterile areas. Like the scrub room, the sterilizing room should also be between two theatre units. Its size may also be 80 to 100 sft.

6.4.7 Rooms for Anaesthetising the Patients:

i) Anaesthetist: A room of size about 160 sft. should be provided with toilet facilities.

ii) Anaesthetic Storage: An area of about 80 sft. may be provided for anaesthetic storage.

iii) Anaesthesia Room: A room of size about 160 sft. is required for anaesthesia.

All these rooms should be grouped together and placed very close to the operation theatre.

6.4.8 Frozen Section: In the operating theatres of large hospitals where pathology facilities are adequate, it will be a great advantage to have a room in the operating theatre block, earmarked for pathology department where Frozen Section Examinations of specimens can be made and a report given to the surgeon within 30 minutes so that the surgeon can decide further operative treatment. The size of the room may be 80 sft. and it should be located in the clean area of the main operation theatre.

6.4.9 In large hospitals where X-Ray facilities are satisfactory, it would be an advantage to have a room in the operation theatre to keep one or two mobile X-Ray plants and another room to develop the X-Ray films quickly. This is particularly essential in hospital where there is a good orthopaedic surgical setup. Fractures can be reduced and their position checked quickly. It will also be useful for gall bladder and kidney surgery. An area of 80 sft. would suffice.

6.5 Ancillary Accommodation:

6.5.1 Instrument Room: The size of the instrument room may be 160 sft. for small hospitals and for big ones it should be larger, say 240 sft.

6.5.2 Sterilizing Room: The desirability of centralizing sterilization and supply is no longer disputed. The design of CSSD is discussed in detail in Chapter No.7. Since operating department is the single largest department receiving supplies from the CSSD, this should, preferably be located close to the operating department. In small hospitals, the CSSD can be attached to the operating department in the same floor and in large hospitals the CSSD can be located in the ground floor right under the operating department, and sterilized material transacted through lifts.

Centralising steriliation, though desirable and economical, will take time to gain recognition. Till then the Panel is of the opinion that facilities for sterilizing instruments used in the operating department should be provided in the complex of operating department itself apart from the sterilizing unit related to the other departments of the hospital. Its size could be 320 sft. It may be attached with storage facilities for keeping oil, fuel etc. The size of the store can be 80 sft.

6.5.3 Doctor's,Nurse's and Sister's Room: Doctors and nurses must have change-cum-sitting rooms with attached toilets. In hospitals with more than 200 beds it will be necessary to provide separate accommodation for senior and junior doctors. Those upto 200 beds need only one room. It may also be

necessary to provide separate accommodation for lady doctor, if envisaged.

The size of the doctor's room may be 120 sft. if the number of theatre is only one; for every additiona theatre, about 40 sft. may be added. Similar is the case with junior doctors, if provided. The rooms should have attached toilet facilities with shower arrangements.

There should be two rooms for nurses and sisters separately for hospitals above 200 beds and in case of those upto 200 beds, there need be only one. The size of the rooms may be 120 and 160 sft. respectivel for the nurses and sisters with separate toilet facilitie

6.5.4 Trolley Bay: Storage space for torlleys and stretchers must be provided. It can be an alcove of 80 to 120 sft.

6.5.5 Pantry: Staff, working in the theatre area continuously for a long time, would like to have refreshments like tea or coffee. For this purpose a small room of size, say 80 to 100 sft. is needed.

6.5.6 Linen Room: Storage of clean linen may be combined with the sister's room. Storage of soiled ones should be placed at one end so as to be outside the aseptic and clean areas. Its size may be 80 to 100 sft.

In large hospitals, an additional area of 40 sft. may be provided to accommodate a tailor for attending to the repairs of the linen pertaining to the operating department.

6.5.7 Janitor's Closet: Provided in the form of a closet, a storage area of 60 sft. is required for keeping the cleaning equipment and material.

6.6 Pre-operative Ward:

6.6.1 Patients are transferred from thier respective wards to the pre-operative ward before taken into the operation theatre for pre-medication. They await their turn of operation here. Pre-operative ward is therefore one of the facilities considered in the design of operating department. But we have seen some hospitals where patients were kept on trolleys in the corridor, awaiting their turn for operation. This is not a healthy procedure. We consider that, whether the hospital is big or small, pre-operative wards may be provided separately for male and female in all new constructions to come. The number of beds is determined on the basis of one bed per theatre. Area per bed will be 70 sft. Toilet facilities should be attached to the ward.

6.7 Recovery Ward:

6.7.1 Immediately after the operation, all patients are not fit to be transferred straight to their wards. They have to get over the effect of anaesthesia. For this purpose they are held in a ward situated close to the operating units, until such time they are found fit to be taken back. Recovery beds at the rate of two per theatre may be provided. Area per bed may be 80 sft. including storage.

6.8 Post-operative Ward:

6.8.1 Patients who have undergone major operations, are kept under post-operative care and treatment in a special ward. Its design is identical to other wards. except that the bed centres will bekept 8'-0" apart to permit use of special equipment. The ward will have storage facilities for the oxygen apparatus, iron lung, blood transfusion apparatus etc. Air-conditioning of these wards is desirable. Post-operative beds are provided at the rate of four beds per theatre subject to a maximum of 10% of the surgical beds. Area per bed will be 80 sft.

6.9 Room for Class IV Staff:

6.9.1 Class IV staff is required to work during nights in large hospitals and as such, the provision of a retiring room is essential. The area may be 120 to 180 sft.

6.10 Relatives' Waiting Rooms:

6.10.1 Relatives are not allowed to enter the theatre complex and as such one or two rooms may have to be provided adjoining recovery ward to enable them to wait and meet the patients after operations. Toilet facilities may also be attached to the waiting rooms.

6.11 Engineering Specifications:

6.11.1 Windows: Windows should be made dust proof providing rubber strips. The opening may be about 15%

of the floor area of the theatre. The sill of the window may be kept at 3'-4" above floor level.

6.11.2 Doors: The doors should be wide enough to permit unobstructed passage for patients. These shall be double acting, two leaf type and 5'-0" wide.

6.11.3 Finishing: The floor, ceiling and the walls of the operating room should be finished with materials which would be thoroughly cleaned and washed. In some places the wall surface is plastered with cement mortar and painted with emulsion paint which is washable. In some places, they are finished with terrazo tiles and alternatively with in-situ mosaic plastering. In other places, they are finished with glazed tiles of either cream, blue, green or voilet colour.

The finishing of walls, floors and ceiling should be moisture proof. Sharp corners, which would accumulate dust should be avoided. The junction line of the walls and the ceiling may be curved to prevent accumulation of dust and to facilitate cleaning.

Finishing with glazed or ceramic tiles will be highly expensive and will not be free from unevenness. Finishing with terrazo tiles will not be so expensive as the former but will still have the disadvantage of uneven finish, especially in walls. In-situ mosaic

finish is recommended both for floor and walls. The colour of the floor finish may be cream and that of the wall may be natural green which is very pleasing and restful to the eye.

Ceiling may be plastered with cement mortar and painted white with any kind of washable paint to match finish.

Electro-conductive Flooring for Operation Theatres: The gases used in anaesthesia are largely explosive. These are used in dilution with oxygen and other gases which add fuel to the fire. The source of ignition is the spark from static electricity.

The safeguards practised are the elimination of open electric circuits in the operating room.

On the subject of flooring, in order to prevent the accumulation of dangerous electrostatic charges, the entire surface of the floor shall provide a path of moderate electrical conductivity between all persons and the equipment making contact with the floor. The floor should be conductive enough to dispel static and yet not so conductive as to contribute to electric shock. There are flooring materials in the market in which the principal ingredient is linoleum or rubber or plastic or terrazo with embedded wire fabric or with reasonably conductive agents in the cementing materials. Of these, the most satisfactory material is the terrazo

variety. In locations where these materials are not available, "terrazo with a 4" on centres grid of brass or bronz strips, brazed together at intersections and grounded to a water pipe" may be adopted.

6.11.4 Lighting: Electric circuits should be concealed. Apart from special lighting facilities provided for operating, general illumination is necessary for cleaning, washing and preparing the rooms for operation. This can be obtained from fluorescent tubes embedded in the ceiling.

6.11.5 Air-conditioning: We have earlier indicated that theatres should preferably be air-conditioned. Small hospitals, where the number of theatres does not exceed eight, will not require a central plant and can possibly manage with room coolers. But in large hospitals where the number of theatres is more than eight, central plant will be more economical. Provision of plant rooms should therefore be made. Its size may be about 200 sft. Its location should be planned such that the theatres are not affected by the vibration caused by the operation of plants.

6.11.6 Staircases and Lifts: In small hospitals the planning of vertical circulation is not a problem but in large hospitals vertical circulation requires careful

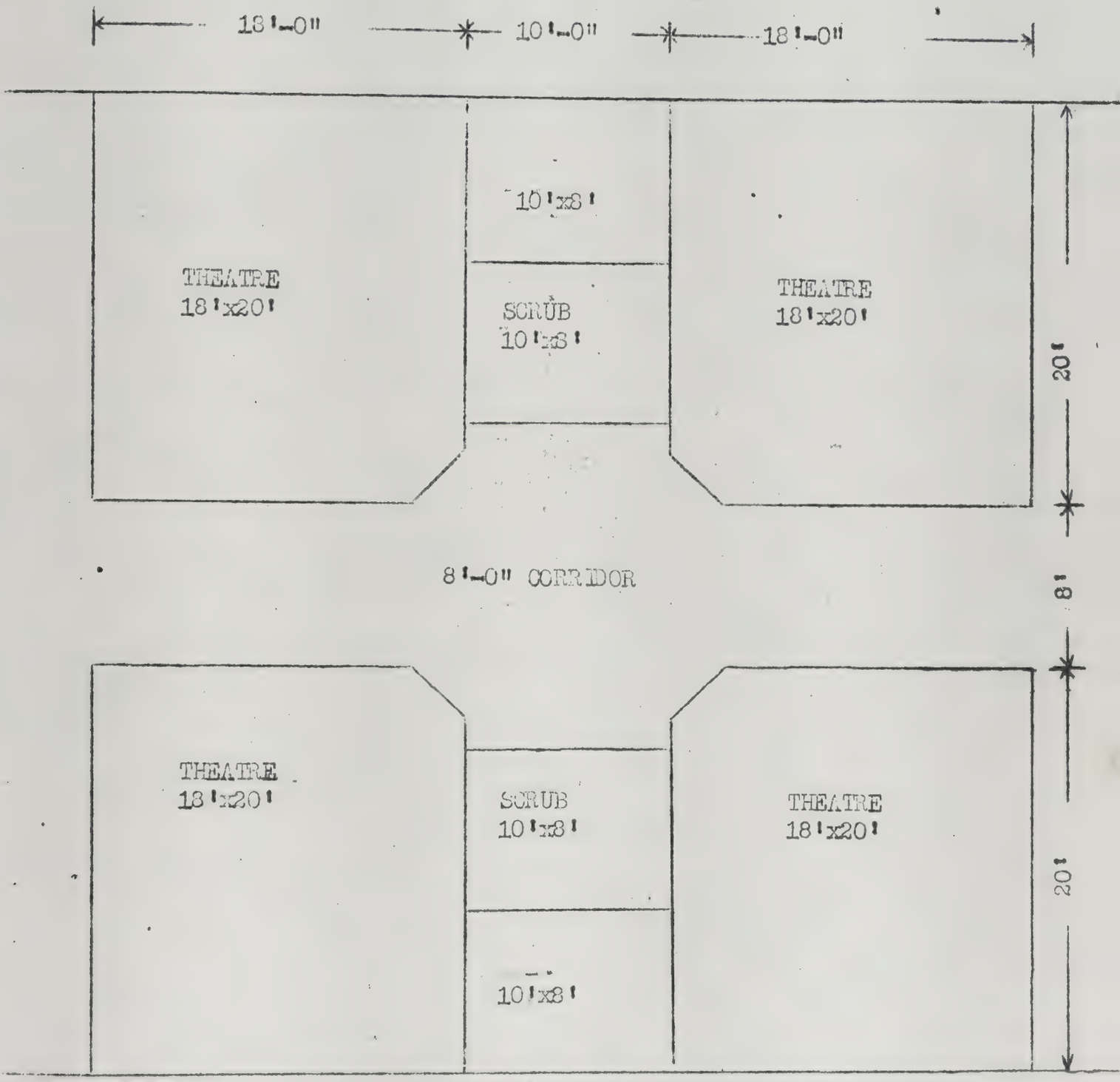
consideration. Access to clean and unclean areas should be separate. In multi-storey construction, lifts in addition to staircases, are essential.

6.12 Type Plan:

6.12.1 Plate No.4 indicates grouping of a set of six theatres in one floor with its ancillaries.

PLATE NO. 3
Para No. 6.3.2

A TYPE PLAN OF 2 OPERATING THEATRE UNITS



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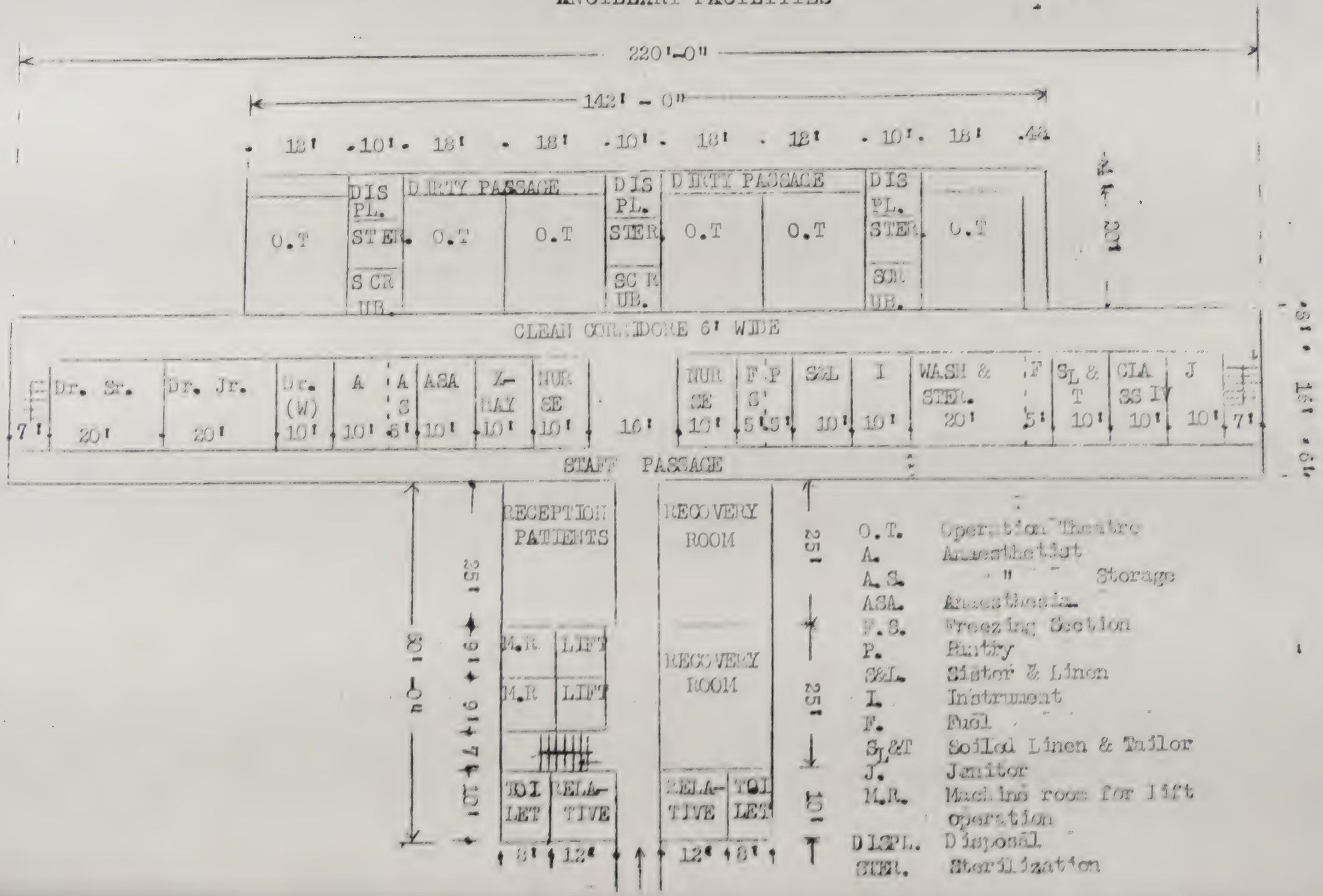
LAYOUT FOR OPERATION THEATRE WITH ANCILLARY FACILITIES



7. CENTRAL STERILIZATION AND SUPPLY DEPARTMENT

7.1. Sterilization, being one of the most essential services availed in hospitals, requires the utmost consideration in planning. The study of the sections in a few hospitals revealed that there is no set practice with regard to its management. In some hospitals the service is partially centralised while in others it is decentralised and carried out in every department. Opinions on this subject is divided. If sterilization is decentralised and carried out in every department, it requires more equipment and trained men.

7.2 Centralization, no doubt, increases efficiency, results in economy in the use of equipment and ensures better supervision and control.

7.3 The recent trend abroad is to combine sterilization for a number of hospitals. This perhaps may not be feasible at present, in our country. Our efforts could be directed towards centralising sterilization in each hospital, for the present.

7.4 The equipment include trays, suture sets, syringes, scissors, needles, clip remover, gloves etc. It also includes supply of sterile solutions and sterilization of large sized materials like beds etc. The beds are sterilised separately in large sized autoclaves. The other materials and equipment fall into three categories namely:

(a) those related to the operating department,
(b) common to operating and other departments; and
(c) pertaining to other departments alone.

7.5 Since the operating department is the largest consuming area of the sterilized material, it is considered advantageous to locate the C.S.S.D. closer to it. Usually the operating department is centrally located with respect to other departments, therefore, the C.S.S.D. when attached to the operating department is conveniently accessible to all departments.

7.6 In hospitals, with less than 200 beds, sterilization could be fully centralized excluding sterilization of beds and mattresses which may be attached to the laundry unit. In such cases the best position of C.S.S.D., as mentioned above, would be closer to the operating department. Ground floor is best suited for all services including sterilization. The location should be such that the various departments like operating theatres, wards, out patient and casualty departments, receive supply involving shortest possible transit.

7.7 Layout:

7.7.1 One of the possible layouts is indicated in plate No. 5.

7.8. Accommodation:

7.8.1 Accommodation is required for the following functions:

(a) Administration and unsterile storage.
(b) Reception and cleaning of used and unsterile material and assembling packs.
(c) Sterilizing area.
(d) Storage and issue of sterile supplies.

7.8.2 The space requirement of the C.S.S.D. is listed below for different categories of hospitals.

Facility	Bed Strength					
	50	100	200	500	750	1000
General						
a) Administration Office.	-	-	120	120	120	120
b) Store Room (new & unsterile)	120	240	160	240	240	240
Sterilization Unit						
a) Wash up area with a counter to receive used goods.	120	120	180	180	240	240
b) Check up and assembly	180	180	240	240	320	320
c) Autoclave Room	80	80	120	120	160	160
d) Storage and Issue Section	120	120	180	180	240	240
Total:	620	740	1000	1080	1320	1320
Solution Preparation Unit						
a) Glass washing etc.	120	120	120	180	180	180
b) Solution preparation.	120	120	120	180	180	180
c) Solution Storage & Issue.	120	120	120	180	180	180
Total:	360	360	360	540	540	540
Over all total of floor area.	980	1100	1360	1620	1860	1860

7.9 Procedure:

7.9.1 Equipment used in the various departments of the hospital are returned at the receiving counter of the C.S.S.D. either loose, packed or in containers. Syringes, needles, bowls and other instruments are first washed in clean water and then cleaned in antiseptic solution. Some of them are washed in clean

water only. After cleaning, the materials are passed to the sorting and packing area. Here the instruments are checked for quality and quantity. Deficiency is made good by replacement from stores.

7.9.2 The material assembled and packed is then taken over to the sterilizing area which is equipped with autoclaves. In modern hospitals, the autoclaves from the barrier between clean and unclean sections of the C.S.S.D. They are double ended. Unsterile material is charged from unclean area and the sterilised material is drawn out in the clean area.

7.9.3 The sterilised material is stored in clean racks. They should be so arranged that they can be lifted with ease and speed.

7.10 Other items:

7.10.1 In many of the hospitals, distilled water, saline and glucose solution etc. are prepared elsewhere and not in the C.S.S.D. In certain hospitals, they are associated with the Blood Bank. The function of the unit is such that its location in the complex of the C.S.S.D. does not appreciably add to economy or efficiency. At the same time if it is attached to C.S.S.D. it can be brought under unitary control and the sterilizing services can be shared for sterilizing the solution containers as well.

7.11 Alternative method:

7.11.1 In large hospitals, the load of the C.S.S.D. is quite considerable. Bulk of the material pertains to the operating department. The quantity of such

instruments being large, it is often preferred to have an independent sterilizing unit for the theatre complex, leaving the instruments falling under categories (b) and (c) referred to in para 7.4 to be sterilized in a central place which would constitute the C.S.S.D. of the Hospital.

7.11.2 This, no doubt, calls for additional autoclaves and the associated technicians and consequently more accommodation.

7.12. Recommendation:

7.12.1 We, however, are in favour of centralising sterilization for the entire hospital, since it ensures efficiency and economy in the utilisation of equipment, technicians and space as already stated in para 7.2.

7.12.2 The department should be planned with scope for marginal expansion. In a multistoreyed hospital, the C.S.S.D. may be placed in the lowest floor, right under the operating department so that transaction of material becomes handy through lifts, involving only vertical movement.

7.12.3 It is needless to say that the C.S.S.D. should be connected with all departments through telephones.

7.12.4 The department should be provided with adequate sanitary facilities.

7.13. Flow Chart:

7.13.1 A schematic diagram showing the pattern of flow of work is indicated in plate No. 6 as a guide

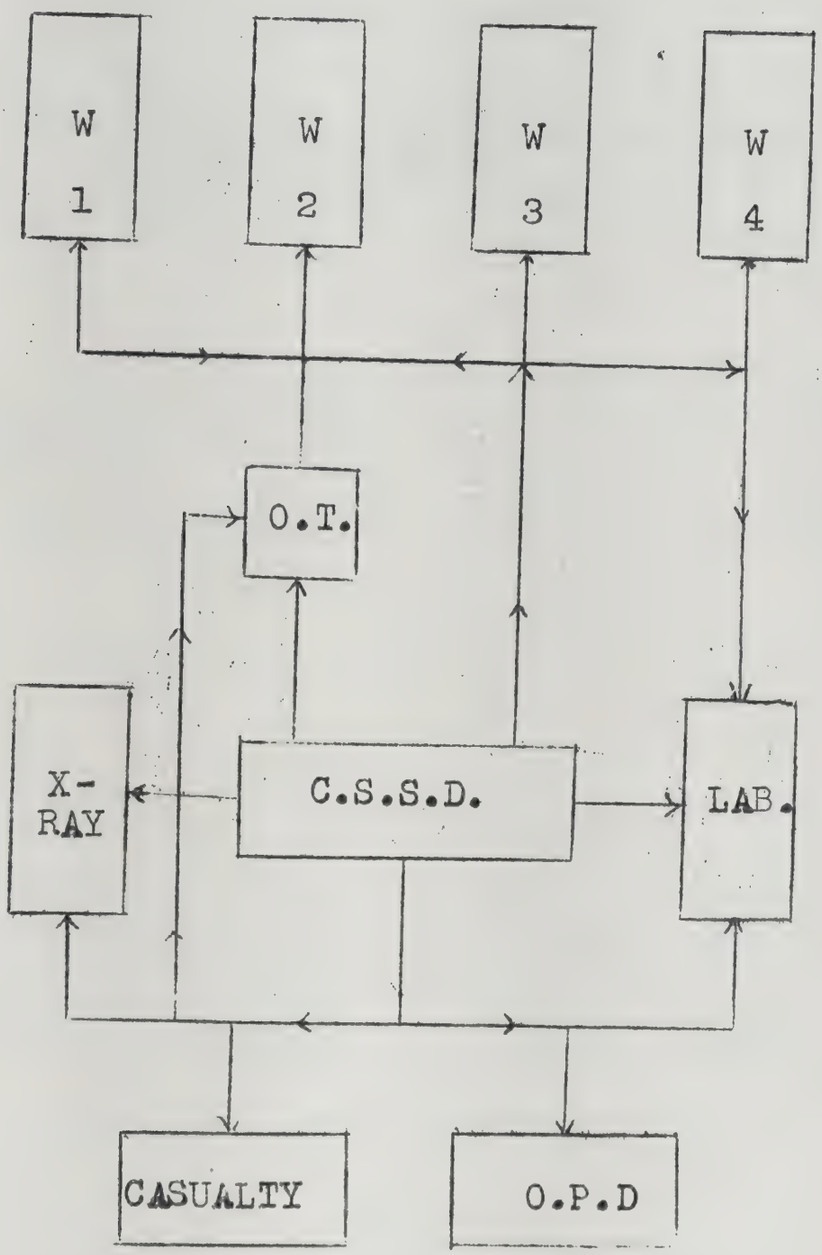
for arranging the facilities on functional basis.

7.14 Sterilization of Bed & Mattresses:

7.14.1 This is generally attached to the linen-maintenance department or to the mechanised laundry if there is one. But where sterilization is centralised, the same could be attached to the C.S.S.D., itself and brought under unitary control. This will include accommodation for the receipt of used beds and work space, sterilizers for beds and mattresses and storage of sterile beds. There should be provision for handling soiled and sterilized linen.

PLATE NO. 5
Para No. 7.7.1

LAY OUT OF C.S.S.D

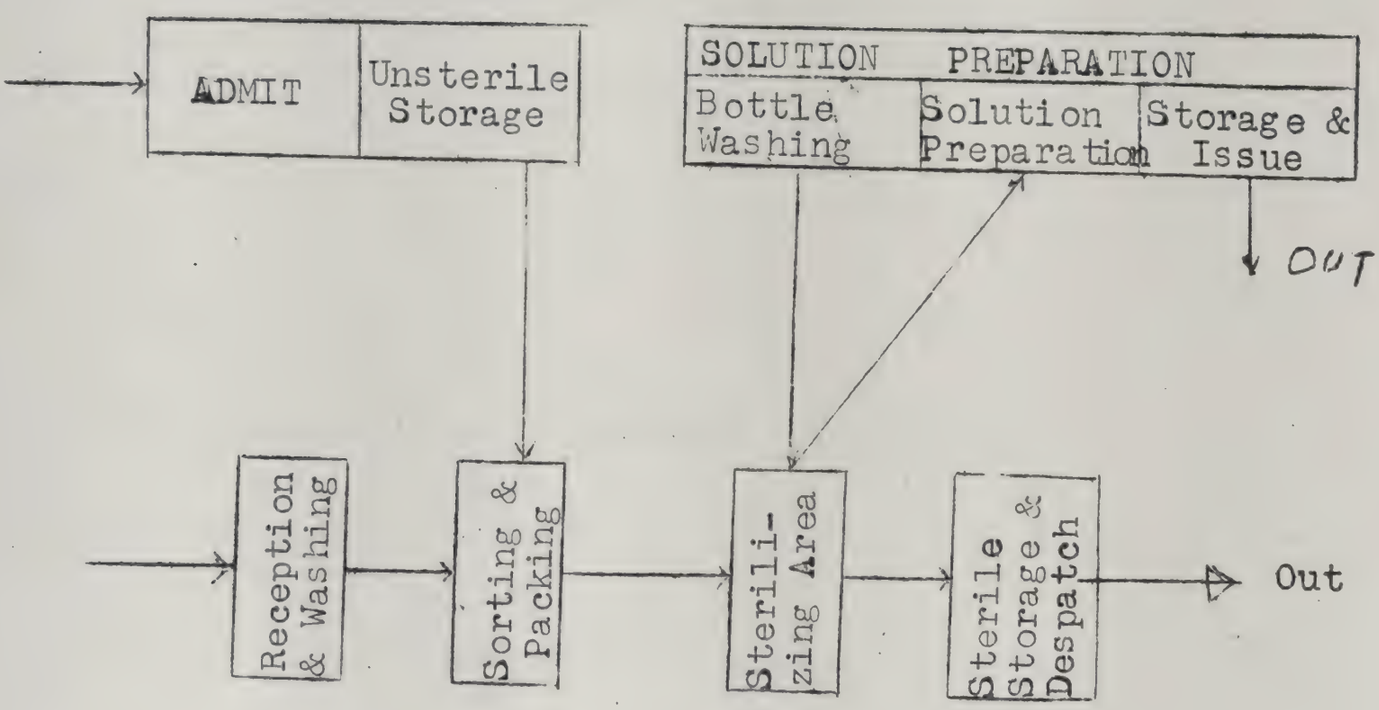


ABBREVIATIONS:

W - Ward
O.T. - Operation Theatre
C.S.S.D.- Central Sterilization & Supply Department.
O.P.D. - Out-Patient Department
LAB. - Laboratory

PLATE NO. 6
Para No. 7.13.1

SCHEMATIC DIAGRAM SHOWING THE PATTERN OF FLOW IN C.S.S.D.



8. MATERNITY AND GYNAECOLOGY DEPARTMENT

8.1 Introduction

8.1.1 Maternity and Gynaecology units are always combined from medical and physical consideration. In cities they may constitute separate hospitals. At district levels and below they are combined with the general hospitals. But they generally function as independent departments.

8.1.2 If the department is physically separated from the rest of the hospital, it would require additional facilities like laboratory, radiology etc. and it would be difficult for the patients to have specialist's advice in other branches of medicine. It is, therefore, necessary that the out-patient unit of this department must be placed close to the other out-patient units but provided with an independent approach.

8.1.3 Maternity service includes ante-natal care, delivery and post-natal care. Before and after child birth, the patient is attended to in the O.P.D. and in between, the patient is confined to bed in the nursing unit. Since these services are cyclic, it would be advantageous to place the inpatient ward close to the out-patient unit making it easily accessible to the child bearing women who need to be admitted. This arrangement gives better facilities for registration etc. and maintains some degree of privacy.

8.1.4 The out-patient unit must be placed on the lower floor. The in-patient unit including delivery suite may be placed on the upper floors accessible by ramps of lifts. Desirably the delivery suite and the nursing unit should be placed in the same floor.

8.2 Out-patient Unit:

8.2.1 The out-patient department would be required to provide the following facilities:

(i) Reception and waiting for registration.
(ii) Registration and record.
(iii) Preliminary examinations.
  (a) weighing.
  (b) urine testing.
  (c) blood test.
  (d) blood pressure.
  (e) recording of history.
(iv) Examination
(v) Treatment
(vi) Paramedical Services.
  (a) family planning and sterility.
  (b) general hygiene and children care.

8.2.2 Reception and waiting for registration:

The out-patient attendance in general hospitals varies from 50 to 200 per session. Ante-natal patients are attended to on two or more days in a week only. Gynaeic patients are interviewed on all days except holidays. In hospitals exclusively intended for maternity and gynaecology patients are seen every day.

The waiting area should be specious and comfortable for child bearing women. We recommend that the area of the waiting hall should be sufficient to accommodate about one third of the attendance at the rate of 10 sft. per patient subject to a minimum of 150 sft.

Since the waiting in this hall is for a length of time, certain facilities have to be provided for. These are:

(a) Toilet.
(b) Drinking water.
(c) Wash basin.
(d) Appropriate number of fans.

8.2.3 Registration counter: The registration counter should be more spacious than is usually provided. The persons working there have to sort out a number of cards and hand over the same to patients, besides entering the names of the new patients who want to be registered. It is here the current records of patients are stored.

Size of the counter may vary between 80 and 120 sft. according to the strength of attendance. The registration counter will be placed at one end of the waiting hall.

8.2.4 Preliminary Examination:

Ante-natal patients have to undergo certain formal tests prior to examination by the doctors. They are weighed, urine and blood tested; blood pressure ascertained and record of patient registered.

These investigations may be carried out in cubicles arranged in a row. There may be four such cubicles with a total area of 200 to 300 sft. depending upon the size of the unit.

8.2.5 Examination: The number of examination cubicles will vary according to the quantum of patients, pattern of staffing and scheduling. For every fifty patients there may be one cubicles. The size may be 180 sft. It will accommodate an examination couch, doctor's chair and table and chairs for one or two followers.

Before the patients are admitted into the cubicles for examination, it is good practice to have them dressed in hospital overalls. Each cubicle shall have two change rooms so that when one patient is being examined the other will get ready. Size of the change rooms may be 30 sft.

8.2.6 Treatment: This is the final stage of the out-patient procedure. A room with one or two dressing tables, work bench and built-in cupboards should be provided next to the examination room. Its size may be 180 sft. Where the dressing table is one, the size of the room need only be 120 sft.

8.2.7 Records: We have already mentioned in para No.8.2.3 that facilities for maintaining

current records be provided at the registration counter. Old records may be shifted to the general record room of the hospital which is also located in the general O.P.D. complex.

8.2.8 Toilet Facilities: Close to the waiting area, a sanitary block should be provided consisting of wash basins, urinals and water closets. The extent of these facilities will be different from normal scales. This may be as follows:

Urinal	1 for 20
Water Closet	1 for 50
Wash Basin	1 for 50

8.2.9 Circulation: All rooms will be more or less built at the periphery of the waiting area. Circulation area will thereby get reduced to the minimum.

8.3 In-patient Unit:

8.3.1 The in-patient unit will include the following facilities:

(i) Reception and admission
(ii) Examination and preparation
(iii) Labour
(iv) Delivery.
(v) Operation
(vi) Ancillary

(a) Sterilization
(b) Scrub
(c) Doctor's changing
(d) Nurses' changing
(e) Anaethetist
(f) Children bath
(g) Sluice room
(h) Toilet
(i) Stores
(j) House keeping
(k) Trolley Bay

(vii) Nursing:

(a) Pre-natal
(b) Post-natal
(c) Post operative
(d) Enclampsia
(e) Clean nursery
(f) Septic nursery
(g) Premature nursery
(h) Baby's bath
(i) General toilet
(j) Nurses duty
(k) Doctors duty
(l) Stores (Linen)
(m) Pantry
(n) Formula
(o) Treatment
(p) Laboratory

8.3.2 Reception and Admission: Patients directed to get admitted into the inpatient department and those in a state of immediate delivery arrive at the entrance of this department. The patient is registered and admitted into the ward concerned. The registration counter opens into the entrance lobby. Size of the counter is about 120 sft.

The entrance lobby is provided with a ramp for receiving patients from ambulance and likewise.

8.3.3 Examination Room: Patients are either transferred from the ante-natal ward or admitted directly to the labour section of the department. It thus, becomes necessary that any patient who comes for admission to the hospital for labour is received and examined before actually admitted to

the labour unit. For this preliminary examination, a room will be required which will accommodate one or two beds and provide space for the doctor with the work table etc. It may not be out of place to point out that since all the patients should be in proper uniform and be admitted after toilet, it would facilitate the work in the wards if a 'change room' with attached toilet could be provided with the examination cubicle. Lockers to keep the original clothes, if necessary, should also be provided. To provide all these facilities the size of the examination cubicle may be 240 sft.

8.3.4 Labour Room: To this section patients are transferred either from ante-natal wards or from examination room or admitted directly from outside. Some hospitals utilise one room for labour and birth whereas in some other cases the pre-birth stage is made elaborate with labour cubicles provided for first stage, second stage etc.

Labour rooms preferably in the form of cubicles are required in the approximate ratio of two labour rooms, one for birth room and one labour

room for every 10 maternity beds. Since, birth follows labour, the labour rooms should be placed adjacent to delivery rooms. The size of the cubicle may be 120 sft.

In smaller hospitals, it may be possible to combine examination, preparation and labour and provide only one set of rooms.

8.3.5 Birth Rooms: Birth rooms are of three kinds. One is allocated for normal deliveries designated as 'clean delivery room', one for septic deliveries etc. designated as 'septic delivery room' and the other for deliveries requiring operation like caesarian known as 'operating delivery room'.

In size and design, delivery and operating rooms will be similar to surgical theatres. The size of the delivery room may be 320 sft. say 18' X 18' or 20' X 16' and that of the operating room may be 400 sft.

Delivery rooms may be provided in the approximate ratio of one for every twenty maternity beds.

In smaller hospitals having upto 50 maternity beds, there may be two delivery rooms and one operating room. In larger hospitals upto 300 beds, there may be one major operating room of size 400 sft. and delivery rooms at the ratio suggested above.

8.4 Ancillary Accommodation- Delivery Suite:

8.4.1 Sterilizing Room: The facilities for sterilization of the equipment in the delivery suites, is either through the C.S.S.D. or this work is undertaken in the unit itself. Accommodation thus will have to be provided according to the arrangements in existence. For any number of delivery rooms, one sterilizing room will be adequate and thus its size may be varied according to the number of delivery rooms. It may vary from 120 to 180 sft. and be provided with a work counter, sink, water sterilizer, small high speed pressure instrument sterilizer etc.

8.4.2 Sterile Store Room: Close to the sterilizing room may be situated a room of size about 100 to 120 sft. for storing sterile materials. It should be provided with issue windows.

8.4.3 Scrubbing Room: Scrub-up facilities may be provided betweentwo delivery rooms similar to those furnished in other operating suites. Size of it may be 100 sft.

8.4.4 Doctor's Room: A room of size 120 to 150 sft. with lavatory facilities may be provided for doctor's changing etc.

8.4.5 Nurse's Room: Another room of the size of the doctor's room with lavatory facilities may be provided for the nurses. It may be placed close to sterile store room.

8.4.6 Anaesthetist's Room: A room for the anaesthetist and equipment is essential in the delivery suite. The size may be 150 sft.

8.4.7 Baby Bath: A bath for the new born babies should be placed close to the delivery rooms. Its size may be 100 sft.

8.4.8 Baby Recovery Room: A baby resuscitation room is desirable to be used by anaesthetist whose services are required in these sections quite frequently. The size of the room may be 120 sft.

8.4.9 Sluice Room: The upkeep of sluice rooms in many hospitals is quite unsatisfactory. It has been commonly noticed that blood stained clothes are washed here. We would suggest that soiled and blood stained clothes should be collected and transferred to the laundry for suitable disposal. Further, effort should be made to install mechanical aid for the washing of bed pans, urinals etc.

8.4.10 Sanitary Unit: Close to the sluice room a sanitary unit may be planned for general use. This may contain water closet, wash basin, women's urinal and bath. Its size may be about 120 to 180 sft.

8.4.11 Janitor's Closet: A janitor's closet similar to what is provided in general operating suite must be provided in the delivery suite. The size of the room may be 60 sft.

8.4.12 Trolley Bay : Space for keeping the trolleys and stretchers may be provided in the delivery suite. It may be in the form of an open bay and the area may be 60 sft.

8.5 Nursing Unit:

8.5.1 Ante-natal Ward: The women patient admitted for treatment during the period of their pregnancy need accommodation separate from those that have undergone the labour. These have to be in the proportion of 10% to 15% of post-natal beds. These wards will need the same ancillary rooms as for post-natal or lying-in wards. Besides these, provision must be made for a fully equipped laboratory. The treatment room also should be larger than the normal.

8.5.2 Eclampsia Ward: Eclampsia patients fall under ante-natal and postnatal category. Eclampsia unit may form part of the ante-natal ward and placed close to the labour unit. The number of beds may be in the proportion of 1 to 20 of postnatal beds. Area of the ward may be 120 sft., 180 sft, 240 sft. and 320 sft. for 1 to 4 beds respectively.

8.5.3 Postnatal Clean or Lying-in Ward: Patients who have had normal deliveries and do not suffer any complication calling for medical care are admitted to the clean lying-in wards. These wards may preferably be a combination of single bed rooms, three and six bed cubicles and twelve to sixteen bedded ward.

For example, in a ward of 32 beds there may be two of single bed rooms, two of three bedded cubicles, two of six bedded cubicles and one of twelve bedded ward. Though large number of cubicles with small number of beds is desirable, the suggested pattern is obligatory on account of the non-availability of nursing staff. It would be possible to remodel the ward into cubicles when staff position becomes easy.

The size of the ward will depend upon the prevailing practices which are of two kinds,
(i) keeping the babies with the mothers; and
(ii) keeping the babies in a central nursery.
Since the procedure of keeping the children with the mothers is becoming popular and acceptable, we would recommend that the size of the wards should be adequate to accommodate mothers' beds attached with bassinets.

The size of the cubicles and wards may be as follows:

S.No.	Cubicle/ward	Size sft.	Area per bed sft.
(i)	Single-bedded room	120	120
(ii)	Two-bedded room	180	90
(iii)	Three bedded cubicle	240	80
(iv)	Four-bedded cubicle	320	80
(v)	Six-bedded cubicle	480	80
(vi)	Eight-bedded cubicle	640	80
(vii)	Twelve-bedded ward	960	80
(viii)	Sixteen-bedded ward	1280	80

8.5.4 Septic Ward: It is necessary to allocate a few beds for septic cases. The proportion may be upto one third of the ward strength. However, one need not be very much concerned about the proportion since there is enough flexibility in the provision of cubicles which can be used as required. The cubicles being themselves physically separated, further segregation of clean and septic areas is not called for.

8.5.5 Post-operative Ward: Patients who have undergone operations and have suffered loss of blood require intensive care and are kept in specially equipped post-operative wards. In design they will be similar to the one available in the other nursing units of the hospital. The size of the ward may be designed to accommodate beds in the ratio of two per delivery rooms including operating room. Area per bed may be 100 sft. This unit may be placed in between the delivery suite and the lying-in ward.

8.5.6 Number of Beds: The assessment of maternity beds required to serve a community must be on a rational basis. This cannot bear a logical proportion to the bed strength of the hospital. Roosenfield Isadore has indicated a formula which is illustrated with an example below:

Example

Steps

1) Present population of the community (say)	1,00,000
2) Birth rate	say 20 per 1000 population.
3) Average stay in the hospital.	7 days

4) Occupancy of beds (assumed) 95%

5) Births per year: 20 X 100 2,000

6) Hospitals days for a year: 2000 X 7 14,000

7) Maternity beds required at 95% occupancy. $\left(\frac{14,000}{365}\right)$ say say 38

8) Beds at 100% occupancy $\frac{38X100}{95}$ 40

Hence 40 beds with bassinets, plus 10% provision. i.e. 4 bassinets for prematures and about the same proportion for isolation are the obstetrical requirement of the community. The beds available already may be subtracted to know the additional requirement.

8.6 Ancillary Accommodation in Wards: Ancillary facilities such as nurse's duty room, treatment room, pantry, sanitary unit etc. should be placed as to involve minimum of travel.

8.6.1 Nurse's Duty Room: The size of the room may be 120 sft. and attached with lavatory facilities.

8.6.2 Pantry: Size may be 120 sft.

8.6.3 Stores: Attached to the nurses duty, may be provided a store room for keeping linen, records and others minor equipment. The size may be 120 sft.

8.6.4 Doctor's Room: Doctors on duty orthe visiting doctors may have a room in the nursing unit itself. This may also be used by the house surgeons. The size of the room may be 120 sft. and attached with lavatory facilities.

8.6.5 Treatment Room: A treatment room in the nursing section, but not in the delivery suite is essential for dressing, removal of sutures and similar procedures. The size may be 180 sft. A work counter with a sink and a treatment table are the major facilities provided in the room.

8.6.5 Laboratory: A well equipped clinical laboratory is an essential requirement of the obstetrical nursing unit. Its size may be 120 sft.

8.6.7 Dirty Utility Room (Sluice Room) For the collection and disposal of unclean materials, there is a need of a sluice room of size 120 sft.

8.6.8 Sanitary Unit: This may be provided at one end of the ward or preferably in between cubicles, so as not to interfere with the cleanliness in the wards. The number of water closets, urinals and baths may be provided, following the general scale for hospital.

8.7 Nursery: Healthy babies are kept with the mothers. However, certain proportion of the children are born premature and an equal proportion of children fall sick, who require intensive care. The proportion of these children may be ascertained in the following manner for a ward of 20 maternity beds:

Steps

1) Average stay of mothers = 7 days

2) Total number of beds in the ward = 20

3) Total expected live births: $\frac{20X365}{7}$ = 1040

4) Premature infants 10% of 1040 = 104

5) Average stay of premature children. = 30 days

6) Full term infants: $\frac{(1040-104)}{365}$

$= \frac{936X7}{365}$ = 18

7) Premature bassinets: 104/12 = 9

8) Suspect bassinets: =10% of 18 = 2

8.7.1 Clean Nursery: An independent nursery for housing healthy babies is not considered essential. However, a nursery with two to four bassinets will have to be provided close to the post-operative ward. The floor space required for such bassinet is 40 sft.

8.7.2 Septic Nursery: Babies known to be or suspected of being infected must be kept in an isolated room with cubicles. It can be seen from the above example that the number of such cases is about 2 in a ward of 20 beds. On the lines indicated above the number can be ascertained for any strength of a ward. This nursery should be segregated from the normal and premature nurseries. A number of 40 sft. of floor space is required for each bassinet.

The nurse's station should be so arranged as to ensure continuous watch over the sick children.

8.7.3 Premature Nursery: It must be an independent provision. The number of bassinets to be provided in this unit is ascertained following the principle cited above. Individual heated bassinets or incubators with temperature and humidity control should be furnished and oxygen outlets installed. The floor space for bassinet may be 40 sft.

In order that the babies are not disturbed by the frequent opening of door, glazed view windows may be provided so that the nurse can look through the symptoms of call of her service.

In a room of size 20' X 20' about 10 to 12 infants can be accommodated, dividing the room into cubicles with suitable glazed partitions. More than one infant can also be in a cubicle.

An ante-room must be provided with the nursery to accomodate the nurse on duty and to render treatment to the infants. The size of the nurse's duty room may be 120 sft.

8.7.4 Formula room must be provided close to the nursery for the preparation of food for the infants who are not fully breast-fed. Its size may be 120 sft. If bottles have to be washed and sterilized in the unit, an additional are of 80 sft. is required. This, however, has to be tied up with the type of supply received from the diet kitchen of the hospital.

8.8 Supporting Facilities:

8.8.1 Call System: Where the ward is divided into cubicles it becomes necessary to establish an effective mode of communication for drawing the attention of the nurse who may be sitting in her station. Light or bell calling system may be introduced providing a switch at patient-end and light or bell at nurse-end.

8.8.2 Air-conditioning: Obstetrical units may preferably be air-conditioned. The delivery suite, post-operative wards and nurseries must be given priority and the rest of the unit may be considered next. Adequate space for housing air-conditioning equipment should be provided for in each floor.

Care should be taken to see that the plant room is not located near the nurseries and especially premature nursery. The vibrations have adverse effect and it should, therefore, be kept as far away as possible. The size, may be decided in consultation with the air-conditioning agency.

8.8.3 Switch Room: The switch room may be placed close to the plant room and its size may be 40 sft.

8.9 Planning:

8.9.1 Circulation: The ward should be planned on central corridor pattern. The mothers' cubicles and the sanitary units may be kept on one side, the nurseries and ancillary facilities may be arranged on the opposite side. The width of the corridor shall not be more than 8'-0" clear.

8.9.2 Siting: The maternity and gynaecology unit may be placed such that access from public road is easy.

8.9.3 Lay out: A layout of the department including out-patient and inpatient departments will follow the flow chart given in Plate No.7.

8.10 Gynaecological Unit:

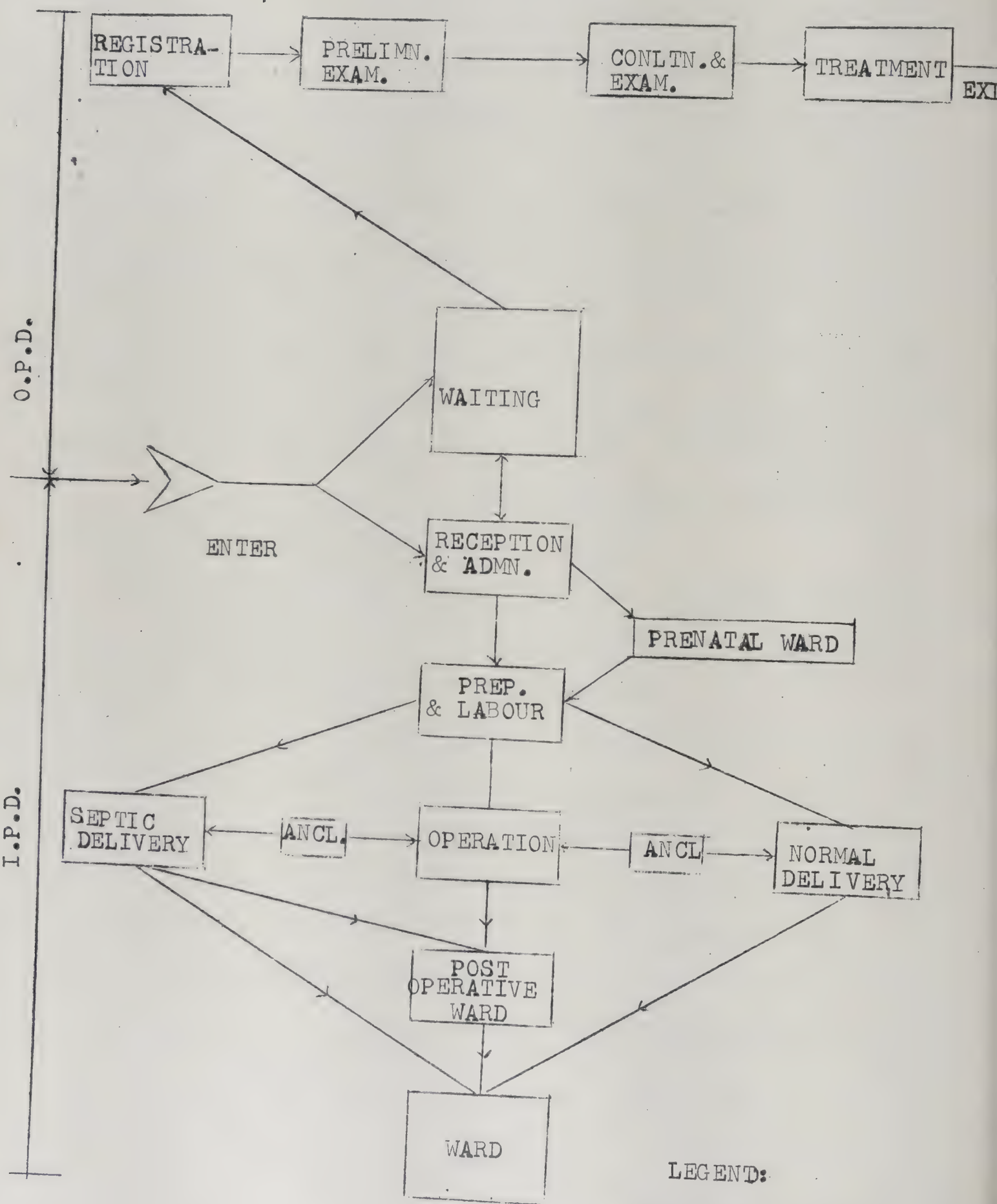
8.10.1 This is a speciality which has developed and needs a collaboration more of other departments than that of obstetrics. The old idea of most of the gynaecological cases arising of bad obstetrics is not true in the present age. The gynaecological disorders need investigations in the medical and endocrinological investigations. The number of beds for this subject do not hold any definite ratio to that of obstetric unit. Yet the two units are combined under one department since both concern the women.

The total number of beds could be divided into three sections: (1) clean cases (2) septic cases and (3) post-operative cases. Besides the wards; this unit needs a fully equipped operation theatre with its ancillaries and a laboratory.

8.10.2 Gynaecological Wards: Roughly the proportion of gynaecological beds may be 40% of the maternity beds. The floor space required per patient, ancillary facilities and the design of the ward will be similar to those of surgical or medical wards of the hospital.

PLATE NO. 7
Para No.8.9.

LAY-OUT OF THE MATERNITY AND GYNAECOLOGY DEPT.
INCLUDING O.P.D AND I.P.D



LEGEND:

PRELIMN.	PRELIMINARY
EXAM.	EXAMINATION
ANCL.	ANCILLARY
CONLTN.	CONSULTATION

9. PSYCHIATRY DEPARTMENT

9.1 A mental hospital falls under the category of special hospital and hence it is outside the scope of this report to deal with at any length. However, general hospitals do render out-patient service and provide facilities for short stay.

9.1.1 Where such facilities are provided in general hospitals, they are physically isolated from the general O.P.D., barring a very few hospitals where it is kept in the complex of the general O.P.D. Even there, it is practically isolated by staggered scheduling.

9.2 Out-patient Facilities: These may include:

(i) Waiting room.
(ii) Registration counter and office.
(iii) Social worker's room.
(iv) Consultation cubicles.
(v) Treatment room(s).

9.2.1 The nature of these facilities indicates that they can be shared between other departments like 'Medical' or 'Surgical'.

9.2.2 It is, therefore, considered that in a general hospital the facilities of the department of either medicine or surgery can be utilised by the psychiatric unit also, by suitable scheduling. Where elaborate facilities for diagnosis treatment and short stay are contemplated, they may form an independent unit.

9.3 Size of Facilities:

9.3.1 Waiting Room: The number of clinical visits per session should be estimated and accommodation provided for one third of the total number of [illegible] at the rate of 8 sft. per patient.

This takes care of followers as well.

9.3.2 Office-cum-record Room: Record of psychiatric patients is kept separate. The office provides facilities for the registration of patients and accommodation for the social worker(s) who collects the back-ground information of each patient and maintains those records. A floor area of about 160 to 200 sft. is required.

9.3.3 Consultation Cubicles: The number of cubicles depend upon the volume of attendance. Basically it requires two cubicles, one for the psychiatrist and the other for the psychologist. The Panel came across an arrangement where three patients were consulted simultaneously at three places in one and the same hall without even providing curtains in between. This cannot be considered as satisfactory. The Panel recommends cubicles which should be reasonably sound proof, where only one patient is consulted at a time. The size of the cubicle may be about 80 sft. and the number of such cubicles may be two or four. As it has been pointed out earlier, the consultation cubicles of the medical and/or surgical clinics can be shared by staggering the working hours if the programme does not include comprehensive treatment and short stay.

9.3.4 Treatment Rooms: This should be so placed as to serve conveniently both out and in-patients. The complex will include a waiting room or lobby, dressing cubicles, ante-room to E.C.T. room, Electro Convulsive Therapy (E.C.T) room, insulin injection room, recovery room and toilets.

(i) Waiting Space: After consultation and examination the patients have to wait for treatment. A floor space equal to that of the first waiting hall is recommended.

(ii) Dressing Cubicles: Before treatment, it becomes necessary for the patients to remove some of their garments and keep them safe in cubicles which afford adequate privacy. There may be two such cubicles each of size 30 sft.

(iii) Ante Room to E.C.T. Room: Prior to E.C.T. treatment the patient is prepared and placed on a trolley and wheeled into the E.C.T. room. There may be two such rooms one for men and another for women. The size of the room may be 120 sft.

(iv) E.C.T. Room: Here the patient is subjected to electro convulsive therapy. The size of the room may be 180 to 200 sft.

(v) Insulin Treatment: This is a common treatment for Psychistry Unit. It may be provided with accommodation for the nurse where insulin, linen etc. may also be stored. The size of the room may be 120 sft. After injection the patient is kept under observation for some time. The treatment section will be one for men and the other for women with two or more beds in each ward. The size of the ward may be about 360 to 400 sft. for 4 beds. The ward must be provided with lavatory conveniences.

(vi) Electro-encephalography: (E.E.G.) is becoming increasingly used in large hospitals, above

500 beds by neurologists and phychiatrists. The facilities in this section will include; (a) examination cubicle of size about 80 sft. (b) instrument room of about 100 sft. (c) and office-cum-record room of size about 120 sft.

9.4 In-patient Section:

9.4.1 The provision of ward and other ancillary facilities is the same as for medical or surgical section of the hospital. Window and verandah opening should be covered with steel fabric or concrete jally work, lest the patients meet with accidents. Every arrangement in the complex must be made cosy to promote quick recovery of the patient.

9.5 Lay-out:

9.5.1 As in the case of Maternity and Gynaecology Department, here also it is considered advantageous to combine the out and in-patient departments in one complex. The treatment facilities can be shared by convenient scheduling of working hours between in and out-patients.

10. DIETARY SERVICE

10.1 Introduction:

10.1.1 "Food service not only further sustenance, it is a therapeutic tool of inestimable value. Properly rendered, it is a clinical and administrative means of stimulating rapid recovery of patients, with earlier discharge to shorten patient stay; thus it becomes an aid to effective means of increasing utilisation of sorely needed hospital beds."

10.1.2 Food services constitute an expenditure of about one fifth of the operational cost of hospitals. It is important that sufficient thought should be given to proper planning of facilities and the management of kitchens. Training programme should be undertaken forthwith to supply adequate number of trained technicians and administrators. A well equipped kitchen may be poorly managed by unqualified personnel. As observed by us, the standard of catering in any hospital leaves much to be desired. The reasons are many. To mention a few; they are, the dearth of dietitians, lack of good catering officers, shortage of funds and poorly designed kitchens and other utilities. During our discussions with Mr. Belfield Smith, a specialist in catering, he emphasized the great need to train catering officers without which no amount of improvement in the kitchens, would solve the problem.

10.1.3 Much is talked about the need to prevent cross infection in wards but seldom the kitchen receives the same attention. The matter should be given serious

consideration or else hospitals might spread more disease than they cure.

10.1.4 The aim in hospital catering, therefore, should be to produce well cooked, appetising and nutritious food as economically as possible. The achievement of this objective depends on administrative efficiencies 'know-how' of the staff planning; kitchen layout and equipment. In this chapter we propose to discuss, space requirements, services layout of the kitchen and other facilities.

10.1.5 It also includes a case study to indicate how the application of work study helps better planning of layouts resulting in functional efficiency. Architects and engineers are faced with designing new kitchens as well as reorganising the existing ones to bring about more effective utilisation of space and equipment. Improvements do not rest with replacing equipment alone. The kitchen should be conceived as a whole and the facilities should be so arranged as to achieve a smooth work sequence.

10.1.6 The Buildings Projects Team had an occasion to carry out work study in a hospital kitchen . The study resulted in better utilisation of space, rearrangement of facilities ensuring quick and easy flow of men and material between different sections of the kitchen. A gist of the study is given in Appendix. I

10.1.7 It is generally accepted that kitchen attached to the hospital should be exclusively for the service of patients and it may provide independent areas for

the preparation of vegetarian, non-vegetarian and special diets. There is growing trend to combine cooking for patients and staff. But so long as there exists wide gap between the standard of menu desired by the staff and the menu prescribed for the patients, there can be no success. Further study is necessary to evaluate the administrative problems to reach a satisfactory solution which is very desirable in the interest of economy.

10.2 List of Facilities:

10.2.1 The following is the list of facilities to be provided in a kitchen unit.

1. Storage space for:

   (a) Fuel.
   (b) Provisions (wheat, rice etc).
   (c) Vegetables.
   (d) Meat.
   (e) Milk.
   (f) Bread and fruit.

2. Preparation, cooking and service area for:

   (a) General kitchen (vegetarian and non-vegetarian).
   (b) Pan wash.
   (c) Diet kitchen.
   (d) Pantry.
   (e) Trolley bay.
   (f) Service area.

3. Staff accommodation for:

   (a) Dietitian.
   (b) Steward.
   (c) Staff.
   (d) Lavatories.

4. Refuse disposal for:

   (a) Dishes, wastes etc.
   (b) Baptles to be returned or disposed.

5. Circulation space:

Within the kitchen.

6. Additional accommodation for the dining of ambulatory patients (optional).

10.3 Space Requirements:

10.3.1 Provision Store: Opinion is divided on the choice between the systems of obtaining supplies. In some places almost every commodity is received daily from the contractor and in other places perishables are received daily and supplies like wheat, rice, pulses, sugar, ghee and oil are held in stock sufficient for a fortnight and even upto a month. The former practice dispenses with bulk storage but there can be no effective control of quantity or quality. Supplies are consumed before they can be inspected and checked, this is likely to lead to abuse. We are in fovour of "short term storage" and recommend that a room of suitable size may be provided to hold stocks in bulk over a fortnight or a month. Its size may vary between 160 and 240 sft. in respect of hospitals with beds varying from 100 to 1000. The area should be utilised to the optimum by providing built-in shelves at different heights. Adequate ventilation should be ensured.

10.3.2 Day-to-day Store: Quantity of commodities sufficient for a day is issued in advance and is kept in the 'Day-to-day stores' before shifting them to cooking areas. This is necessary for administrative convenience. A room of size 60 sft. is adequate.

10.3.3 Supplies Store: A separate room would be required for the contractor to keep the supplies for inspection and weighment, till they are removed to the stores. In big hospitals, its size may be 120 sft.

10.3.4 Vegetables Store: Vegetables are supplies daily. The place required to store them in transit will be small. During certain parts of the year it might be necessary to keep a stock of vegetables for more than a day or two. It will then be necessary to have the room air-conditioned or as an alternative, a refrigerator of suitable capacity will be required. Since vegetables and fruits are perishable articles, they require separate storage arrangement. The size of the room may be about 40 to 50 sft.

10.3.5 Meat Store: At present all hospitals do not provide both vegetarian and non-vegetarian diet. Since one cannot be certain about the future trend; wherever vegetarian food alone is provided, it is desirable to plan for both, or else reorganisation, when necessity arises, will be difficult and expensive. Preservation of meat will require air-conditioning. The size of the room may be 6' x 6' x8' fitted with adjustable metal shelving.

10.3.6 Milk Store: Milk forms part of the special diet. The supply for the whole hospital is stored and preserved at one place and distributed as required. At times stock may be held over night which will require

cold storage. The size of the room may be about 60 sft. This shall be located close to the diet kitchen. It will be economical if the cold storage arrangement for meat, vegetables and milk are grouped together.

10.3.7 Fuel Store: In our country fuel of various kinds like coal, fuel wood, gas and electricity are used. Coal and fuel-wood require storage arrangements. Although comprehensive data are not available to compare the economies of different types of fuel, it appears that gas is preferred from considerations of ease in operation, and economy in storage and consumption. Experts in hospital kitchen management are in favour of either gas or electricity. The choice, of course, will be based on the cost of consumption per meal. Vessels used for cooking with gas or electricity, remain clean, whereas with fuel or coal cleaning becomes laborious. Fuel-wood kitchens are smoky and untidy.

Under present condition it is not possible to dispense with either coal or fuelwood even if gas is used as the main medium of cooking. It is, therefore, necessary to plan the kitchen with sufficient storage space for coal, fuelwood and gas. Coal and fuel-wood being handled in larger quantities, may be placed closest to the cooking area. Where gas is obtained through cylinders, the storage of gas cylinders should be located outside the kitchen so as to avoid explosion hazard and give easy access for the replacement of cylinders. This is not required in case of piped supply.

The size of the stores may be as follows:-

(1) Electricity	Nil
(2) Gas	60 sft.
(3) Coal	100 sft.
(4) Fuel wood	150 sft.

The floor level with coal and fuel-wood stores may be kept lower than the adjoining floor levels so that air borne dust in these areas will not be drawn into the work areas.

10.3.8 Equipment Store: Vessels, utensils, implements, machines etc. which are not required for daily use, have to be stored in a separate room for effective control by the Steward. Equipment, vessels etc. in daily use, will be kept in the preparation areas.

The size of the store may be about 100 sft. fitted with racks of manageable heights.

10.3.9 Linen Store: Persons employed in the kitchen are supplied with hospital uniforms. New ones are kept in a cup-board in the Steward's room itself. It is not necessary to earmark an area for the purpose.

10.4 General Kitchen:

10.4.1 The general kitchen comprises two sections, one for the preparation of vegetarian food and a similar section for the preparation of non-vegetarian food.. In some hospitals the two functions are distinct and segregated in all respects. An economical proposition might be to prepare vegetarian food in one section for all the patients and prepare the non-vegetarian dishes in a separate place. This will minimise duplication of areas.

10.4.2 The size of the kitchen will also depend on the type and programme of food served in the hospital. Even if a hospital does not have both vegetarian and non-vegetarian food in the programme at present, the possibility of having both in the future cannot be ruled out. Hence, the plan should provided for such developments.

10.4.3 Distribution of food to the wards may be done in a number of ways. The general practice in our hospitals, is to fill up vessels with food adequate for a ward and to take vessels pertaining to two or three wards in each trip through trolleys.

10.4.4 Patients are supplied with food during specified hours. Preparation of food for all the patients takes time and necessitates retention in the pantry before distribution. Whatever may be the type of food prepared, it is necessary to supply the patients with palatable food in a condition acceptable to them. We have not been favourably impressed by the conditions of food as it reaches the patients. Cooked food remain in the kitchen from 8 a.m. before distribution commences at about 11.00 a.m. It is practically impossible to keep food warm for such a long time in the absence of proper arrangements.

10.4.5 Modern nursing homes make use of trolleys which can be preheated electrically. The Panel recommends the use of such trolleys in public hospitals as well. These trolleys are equipped with removable food

containers, which, filled with food, are kept in the pantry in hot closet or in heated trolleys before despatch to service areas. The trolleys are then taken to the ward pantries where either the containers are removed and kept in hot closet or the trolleys themselves are retained until service is completed.

10.5 Trolley:

10.5.1 Trolley Bay: There should be specific space for parking trolleys, close to the pantry. Power outlets should be provided to heat the trolleys if insulated trolleys capable of being electrically heated are in use.

10.5.2 Washing Area: Food containers and trolleys brought back from service areas, require cleaning. They are taken directly into the washing area where the containers will be washed and sterilised; and the trolleys wiped down. In the same area large vessels and other utensils used for cooking will also be washed. Facilities for sterilising the food containers of the trolleys may be provided. The washing area may be enclosed with wire mesh, ensuring adequate natural light and ventilation and shall be sited close to the cooking area. The trolleys, after having been washed, will be parked in the trolley bay. Next to the ward pantry, space should be provided for cleaning and washing of food plates etc. in possession of patients.

10.6. Diet Kitchen: The diet kitchen where special diet including milk, bread, fruit juice etc. are prepared,

should always be independent and kept under the immediate control of the dietitian. For this reason this may be kept next to the dietitians room. The storage space for milk and fruit may form part of the diet kitchen itself. The size of the kitchen may be 120 sft. including storage space for milk, fruit etc.

10.7 Staff Accommodation:

10.7.1 Dietitian's Office: Dietitian is responsible for the type and quality of food prepared day-to-day. A sitting room with lavatory convenience is a necessity. This may be sited close to the diet kitchen which require personal supervision. The size of the room may be 150 sft. including lavatory. Access to dietitian's room should be direct and not through the working area of the kitchen.

10.7.2 Steward's Office: Steward is incharge of the stores and management of the kitchen. Adequate space for records, linen cupboard, work table, chair etc, should be considered in designing Steward's room. The office should be sited close to kitchen, stores and in direct relationship to the main circulation of the hospital to facilitate consultation with hospital officers. Its size may be 120 sft. and fitted with built-in storage cupboards.

If clerks are attached to the office, the size may be 150 sft. for one clerk and 180 sft. for two.

10.7.3 Workmen Rest Room: In a kitchen preparing food for 500 to 1000 patients, about 10 to 20 persons will be employed. A separate room, well lit and ventilated,

should be provided for the workmen to rest at intervals. Space should be provided at the rate of 20 sft. per workman. A bath room with w.c., urinal and wash basin may be attached to the change-cum-rest room. This should be sited not too close to the cooking area, to make the stay uncomfortable.

10.8 Engineering Services:

10.8.1 Services should be designed and installed capable of easy maintenance. Service conveyors may be embedded in the walls. It is desirable to have separate electricity meters for departmental costing and consumption control.

10.8.2 Within the kitchen, gas, electrical outlets and water points should be brought close to the equipment. It is not desirable to site the equipment to suit the service points.

10.8.3 Electrical Installation: This will include light and power circuits with socket outlets. Wiring shall be concealed.

10.8.4 Lighting: Adequate lighting should be ensured for efficient working in the kitchen especially in preparation and cooking areas. Where natural lighting is insufficient, it should be supplemented with artificial lighting to give an average illumination of 15 'lumens' per square foot at the normal working plan.

10.8.5 Telephones: The dietitian's and steward's offices shall be provided with internal telephones and a common booth for external communications.

10.8.6 Fire Alarms and Fire Fighting Equipment: They shall be provided in accordance with the scales laid down by the local Fire Brigade, or the Act governing the locality.

10.9 Siting:

10.9.1 The design of the kitchen need not be conditioned by the structural pattern of other departments. It may preferably be conceived as an independent unit but integrated functionally with the service areas in the hospital. Stores are preferably located in the ground floor and to facilitate transaction between stores and cooking areas, kitchen should also be located in the ground floor. It is found functionally advantageous to group the services together constituting a central service unit. This applies to dietary service as well.

10.9.2 Siting should ensure that any noise or cooking odours emanating from the kitchen do not cause any inconvenience to other departments. The location should be convenient with reference to stores and should involve the shortest possible time in delivering food to the wards.

10.10 Layout:

10.10.1 The several rooms constituting the kitchen unit should be grouped, convenient both for internal working and external service. For the best performance, the facilities should be placed in the following order:

(i) receipt of materials and stores,
(ii) normal and diet kitchens which will have preparation and cooking areas; and
(iii) pantry and despatch area.

Ancillaries such as room for dietitian, steward and workmen, lavatories and bath rooms etc. may be interposed within the complex and without impeding the free flow of operation. A schematic arrangement of facilities is illustrated in plate No. 8.

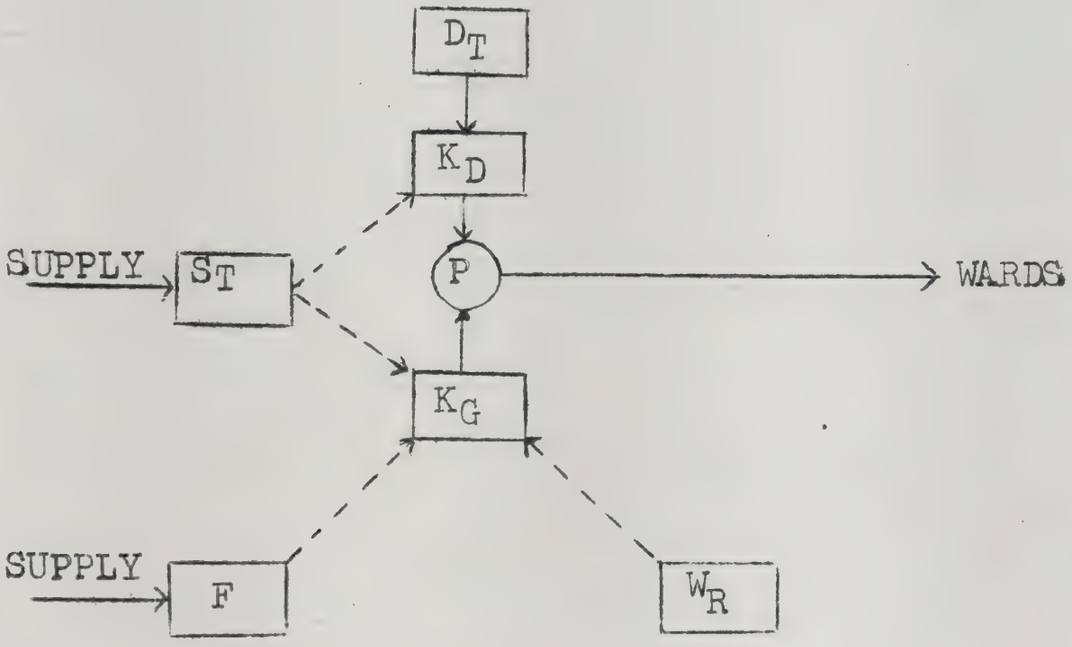
10.11 Area schedule for hospitals of different bed strength.

No.	Description	No. of Beds			
		1000	750	500	250
	Staff Accommodation				
1.	Dietitian room with lavatory.	180	180	120	120
2.	Steward room with storage space.	180	180	120	120
3.	Workmen rest & change room	400	320	240	180
4.	Bath & w.c.	180	180	120	120
	Total:	940	860	600	540
	Stores				
1.	Provision	400	320	240	160
2.	Vegetables store	80	60	40	40
3.	Meat store	40	40	40	40
4.	Milk store	60	60	40	40
5.	Day-to-day store	60	60	40	40
6.	Equipment store	240	160	120	120

7. Fuel store	240	180	150	150
8. Suppliers' store	120	120	120	120
9. Janitor's store	60	60	60	60
Total:	1300	1060	850	770
C. Kitchen				
1. General kitchen	500	500	320	320
2. Diet kitchen	180	180	120	120
3. Pantry	120	120	100	100
4. Washing	150	150	150	150
5. Trolley bay	100	100	80	80
Total:	1050	1050	770	770
Total (A+B+C)	3290	2970	2250	2080
D. Circulation (⅓)	1110	1030	780	620
Total floor area (A + B + C + D)	4400	4000	3000	2700

PLATE NO. 8
Para No. 10.10

SKETCH SHOWING THE SUGGESTED PATTERN OF RELATIONSHIP BETWEEN VARIOUS SECTIONS OF THE KITCHEN UNIT



Glossary:

D_T : Dietitian's room including lavatory

K_D : Diet Kitchen including milk & fruit stores and service area.

K_G : General kitchen including washing area, pantry and service area.

S_T : Stores and Steward's room.

F : Fuel - Stores.

W_R : Workmen rest-cum-changing room including bath and lavatory facilities.

P : Pantry.

COMMUNITY HEALTH
LIBRARY
AND
DOCUMENTATION
UNIT

11. LAUNDRY SERVICES

11.1 Laundering of hospital linen should satisfy two basic considerations namely cleanliness and disinfection. Most of the hospitals have the linen washed through dhoby service. Some of the hospitals have provided suitable ground space and facilities for washing the cloth in the hospital campus itself. Mechanical laundering is obtaining in a very few hospitals. Though the authorities were convinced of the efficiency and economy of mechanical laundering, its wider adoption was handicapped till now due to non-availability of necessary equipment. It is, however, encouraging to note that laundry equipment are already being manufactured in the country and it is hoped that every hospital will have the benefit of adopting mechanical laundering. This should be kept in view while planning new hospitals. The layout should provide room for putting up a mechanical laundry.

11.2 Function of Laundry

11.2.1 The various stages of laundering are listed below:

(a) Collection of dirty linen from the individual departments.

(b) Transport to central dirty linen room attached with laundry.
(c) Sorting of linen.
(d) Removal of blood stains etc.
(e) Disinfecting (autoclaving).
(f) Washing.
(g) Squeezing.
(h) Drying.
(i) Repairs to linen.
(j) Pressing.
(k) Collection in central clean linen department.
(l) Distribution to individual departments.
(m) Storage within departments.

11.8 The functional and space requirements, stage by stage are listed below:

11.3.1 Collection and Storage of Dirty Linen in the Ward.

The Panel had seen wide variation in the systems followed in collecting dirty linen in the ward. Yet no one system is near to what it should be. Some hospitals have provided separate space for handling dirty and clean linen. Few hospitals carry out collection of dirty linen within the toilet unit. Blood stained linen are sluiced in the toilet unit, dried and then passed on to the laundry for further washing. In the opinion of the Panel none of the procedure is satisfactory.

The Panel considers that very little work should be done on dirty linen in the ward premises. The longer the dirty linen kept in or near the ward, greater is the risk of infection to staff and patients. Moreover the task of handling dirty linen is unpleasant and at times unsightly. Such work should naturally be

carried out far away from the ward premises. For these reasons it is suggested that used linen should be collected and dispatched to the laundry within the minimum of time. Used linen may be classified under three categories namely soiled linen, infected linen and fouled linen. It is necessary to categorise them since subsequent treatment varies. Soiled linen require simple washing, drying and ironing; infected linen require sterilizing, washing, drying and ironing; fouled linen require sluicing, sterilising, washing, drying and ironing.

For economy in labour, it is suggested that the linen may be collected in different (impermeable) bags in the wards and other sections and despatched to the laundry.

11.3.2 Transport of Linen to the Laundry

Special types of trolleys may be employed for collecting these bags from different sections. Preferably, the bags should be transported by chutes. In one of the hospitals visited by the Panel, chutes had been installed but were not made use of. On enquiry we learnt that on many occasions there arose disputes over the contents of bags between the despatching and receiving ends. The Panel felt that such trifling obstacles should have been overcome by the authorities and the use of chutes restored. Transporting

of dirty linen along long corridors should, as far as possible, be avoided. Service lifts specially for dirty linen may be installed, if found feasible. Lifts used for transporting patients, food and sterile supply should not be used for transporting dirty linen.

11.3.3. Receiving and Sorting of Dirty Linen in the Laundry:

Dirty linen is received in the 'Dirty Linen Section' of the laundry. Soiled linen will be sorted into alcoves or containers according to size, colour and material.

Fouled linen bags will be separated from the rest and sluiced at the central sluicing point situated close to the laundry. Such an arrangement was observed by the Panel in the Egmore Hospital, Madras and was found to be very satisfactory from all considerations.

'Fouled Linen', after having been sluiced, follow the track of 'Infected Linen'.

'Infected Linen' are separated and sterilised either by soaking in disinfecting solution or by autoclaving. The fouled linen and infected linen, after having been sterilised, follow the track of soiled linen. They are also sorted in the same way according to size, colour and material.

11.3.4 Washing: The sorted linen are charged to the washing machines. This can be done manually. Mechanisation at this point is not considered essential.

11.3.5 Sqeezing: This is the beginning of the clean zone. The washed linen will be hydro extracted by mechanical means.

11.3.6 Drying: The hydro extracted linen will be passed through a drying chamber.

11.3.7 Pressing: The dried linen are examined and those found in good condition, are routed to press. Items in need of repair will be attended to and then routed to press.

11.3.8 Central Clean Linen Room: At this stage linen is transferred to the central linen room which holds the entire stock and distributes a day's stock to the departments.

11.3.9 Distribution to Departments: Linen amounting to daily requirements of various departments may be transported by wheeled trolleys. These may be designed to have separate sections for each items of linen. The section should be capable of adjustment to suit the needs of each department.

11.3.10 Storage within Departments: The chief linen using centres are the wards and the operating depart ent where necessary space should be apportioned for holding clean linen.

11.4 Layout and Structural Consideration:

11.4.1 The arrangement of various facilities described above is indicated in the flow chart given in Plate No. 9.

11.4.2 A single storey, shed type construction will be adequate and economical. The central linen stores and office section may be kept under flat roof.

ame 11.4.3 In the [illegible] area, provision may be made to sterilize mattresses and bed components. The size of the autoclave should be large, say 12' diameter.

11.5 Space requirements:

11.5.1 The accommodation to be provided in the laundry depends upon the number of beds of the hospital and type of equipment envisaged. Experience is lacking in this country so as to lay down norms and standards. However the following norms are suggested as a rough guide. It includes ancillary accommodation such as office, stores, linen repair room, workmen rest room, toilet, boiler house etc.

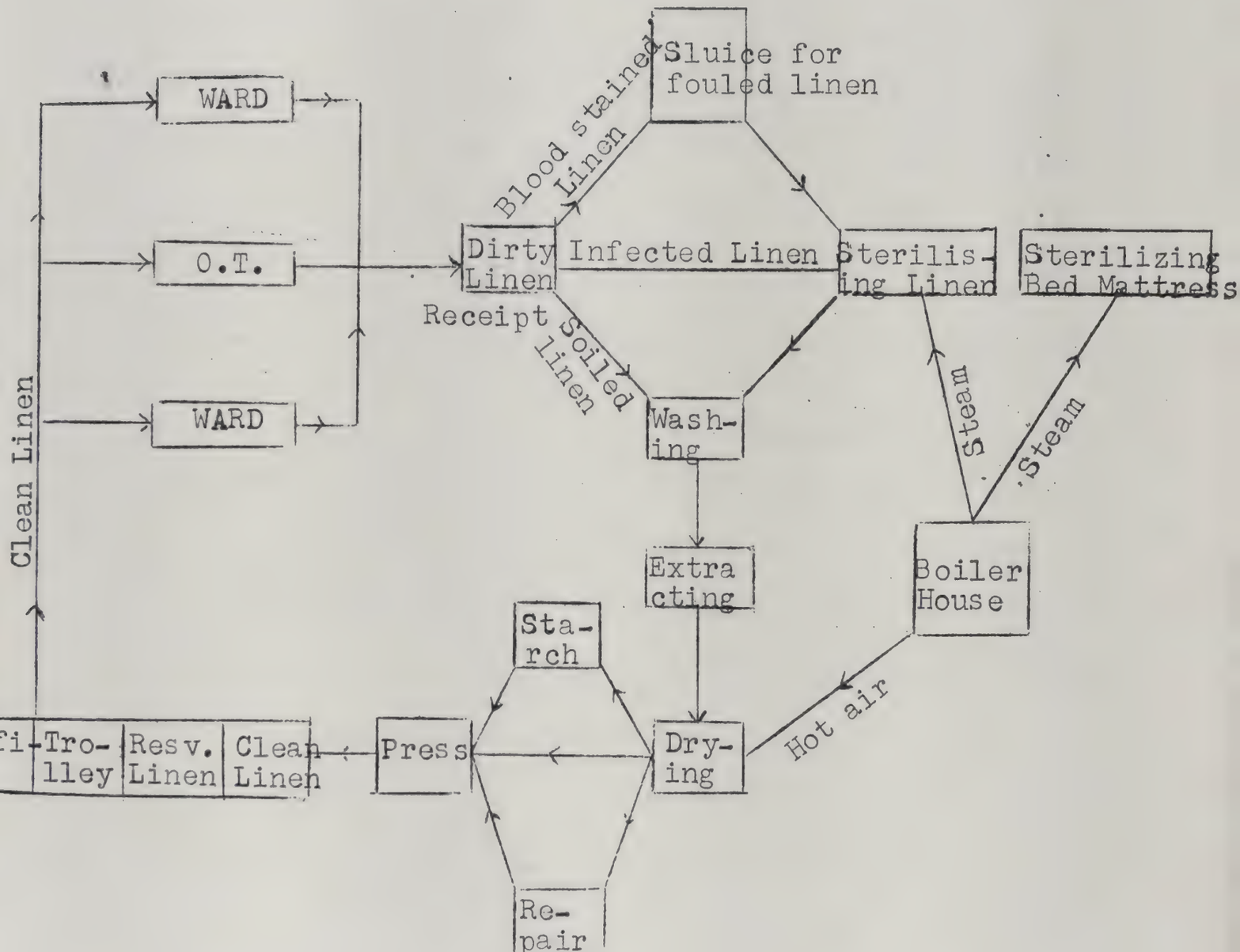
S.No.	No. of Beds	Plinth area (sft).
1.	50	2000
2.	100	2500
3.	300	3000
4.	500	4000
5.	1000	6000

11.6 Location:

11.6.1 Since mechanised laundry occupies less space and can be kept in closed area, it can be located close to the wards in the ground floor so as to minimise carriage.

PLATE NO. 9
Para No. 11.4.1

FLOW CHART INDICATING THE ARRANGEMENT OF VARIOUS FACILITIES OF LAUNDRY SERVICES.



12. PLANNING AND SPECIFICATIONS

12.1 Planning as a whole:

12.1.1 A hospital consisting of several distinct sections is in no way different from a factory with main and supporting facilities. The considerations of planning should be more or less similar. Each section should, no doubt, be designed for its individual efficiency. Nevertheless, the hospital as a whole, would function efficiently and economical only if all the sections are co-ordinated by arranging them in appropriate places based on their functional relationships. The different sections should be located at places which would ensure quick and easy flow of patients and materials.

12.2 Out-patient Department:

12.2.1 The out-patient department must be sited close to the main entrance. Patients visiting the O.P.D. should not have to pass through the in-patient areas.

12.2.2 Whether out-patient department should be entirely separated from the ward block or whether these should be integrated, if so, how much, are points for consideration. In a few hospitals, some of the out-patient clinics

are linked with the corresponding wards. This, no doubt, is advantageous in respect of clinics such as ante-natal, psychiatric, eye and sometimes paediatrics which share equipment with their counterparts in wards.

12.2.3 As far as possible the out and in-patient sections should be kept separate to avoid chances of infection and disturbance. Further, if they are separate, each can grow independently without mutual obstruction. In small hospitals, the problem of siting the out-patient department is not difficult. In large hospitals, all out-patient clinics should be grouped together with horizontal integration with wards with scope for exapnsion. Facilities such as X-Ray diagnosis, pathology, physiotherapy and the pharmacy should be closely related to the out-patient department and interposed between in and out-patient departments so as to be equally accessible to both.

12.2.4 In small hospitals the O.P.D. may be housed in ground floor alone. In large hospitals the number of clinics will be many and will require distribution between two or more floors. In such cases, it is suggested that the emergency, orthopaedic, surgical and ante-natal clinics and registration and record rooms may be placed on

the ground and the rest of the clinics, laboratory and x-ray diagnosis may be placed on the first floor and above, if necessary.

12.2.5 The emergency and accident department should be readily accessible. Its proximity to orthopaedic clinic and blood bank is advantageous.

12.2.6 Pharmacy may be placed either in the basement or on the ground floor.

12.2.7 Since the use of the out-patient department is becoming more and more, its planning should be capable of alteration and expansion.

12.3 Nursing Unit:

12.3.1 Nursing unit will include wards for medical and surgical specialities, obstetric and gynaecology, psychiatry and paediatric. The wards are relegated to the hind position to ensure quietness and free from trespass. In small hospitals the wards will be spread over ground and first floors. In large hospitals they are stacked one above the other to form part of multistorey construction. In such cases the surgical ward is related horizontally to the operating department and the maternity ward to the labour suite.

12.4 Operating Department:

12.4.1 Operating department should be planned with easy access to the surgical wards, central sterile and supply department and the post operative ward or intensive care unit. A mobile x-ray apparatus is stationed in the unit for radio-diagnosis. Laboratory services are availed from the pathology laboratory attached to the O.P.D.

12.4.2 In small hospitals, the CSSD is combined with the operating department in one floor plan whereas in large hospitals the CSSD is placed in the Flower floor of the theatre-block.

12.5 Maternity and Gynaecology Department:

12.5.1 The out and in-patient services of this department are grouped together. In multi-storeyed construction, the ante-natal clinic, which also serves gynae patients are placed on the lower floor and the labour suite and nursing units on the upper floors.

12.6 Paediatric Department:

12.6.1 Modern trend is to provide an independent section for children, combining in and out-patient services. Its design has already been discussed in the Chapter on Wards.

12.7 Psychiatric Department:

12.7.1 In small hospitals, where limited out-patient services are alone extended, the out patient clinic is placed in the general out-patient department. Where special facilities for diagnosis treatment and short-stay are provided, they are all grouped together to form a separate section away from the general O.P.D. In such cases the nursing unit is also attached to the O.P.D.

12.8 Isolation Unit:

12.8.1 This will accommodate both men and women patients suffering from infections ailments. It may be planned as a separate building connecting the main building through a covered passage. However, current practice is to place this unit in the main ward block itself, separated by air gap.

12.9. Hospital Services:

12.9.1 Central Sterilization and Supply Department: In small hospitals this unit is combined with the operating department in one floor. In large hospitals it is placed in the lower floor of the theatre block.

12.9.2 Dietary Unit: This includes the kitchen and the stores. Its location should provide easy access to all wards.

12.9.3 Laundry Unit: Laundry facilities should be designed according to the system in practice. If it is mechanised, it should be sited close to the boiler plant. Or else, one or two rooms may be provided close to the linen stores. Soiled and fouled linen will be collected from the wards, labour and operating departments; fouled linen is sluiced and the whole is handed over to the dhoby for washing.

Some hospitals make provision for dhoby ghats in the hospital campus itself.

In a multistorey construction, the lowest floor of the ward block may consist of the laundry, linen stores, and kitchen with stores.

12.9.4 Mortuary: Mortuary provides facilities for keeping of dead bodies and conducting autopsy. It should be located well away from the patient areas, from where bodies can be moved at all hours. Relatives should be able to have direct access to the mortuary.

12.10 Engineering Services:

12.10.1 Water Supply: Water supply is made available from municipal supply. An over-head reservoir, coupled with ground level sump is essential.

The storage should be for 36 hours with 12 hours supply at the top and 24 hours supply at the ground level. A special generator meant to be used in the event of failure of electric supply, should be provided for energising the pumpting motors.

Water requirements according to I.S.I. standards:

	Type of Buildings	Consumption per head per day (litres)
i)	Hospitals (including laundry) per bed.	
	(a) Number of beds not exceeding 100.	340
	(b) Number of beds exceeding 100	455
ii)	Nurses homes and medical quarters.	135
iii)	Hostels (per bed)	180
iv)	Residences Office	45
v)	Residences	135

Air-conditioning: Water consumption in respect of air-conditioning should be considered exclusively.

12.10.2 Electric Supply: The supply of electricity should be considered from two aspects: one the source and the other, the distribution.

Generally the source is 'public supply'. In addition it is suggested that in large hospitals

generators of suitable capacity should be installed to overcome short break-downs.

One of the generators should be connected to the air-conditioning equipment of the theatre, lighting of operating department and a bed lift placed close to this department. This should be capable of functioning automatically when general power supply fails.

12.10.3 Sanitation: The minimum sanitary conveniences provided in hospitals shall consist of the following, according to the I.S.I. standards.

(i) In-patient Wards:

Fitments	For men and women
Water - closets	1 for every 8 beds or part thereof.
Ablution taps	1 in each water-closet plus one water tap with draining arrangements in the vicinity of water-closets and urinals for every 50 beds or part thereof.
Wash basins	2 upto 30 beds; and 1 for every additional 30 beds or part thereof.
Baths	1 bath with shower for every 8 beds or part thereof.
Bed pan washing sinks.	1 for each ward.
Cleaner's sinks	1 for each ward
Kitchen sinks and dish washers.	1 for each ward.

(ii) Out-patient department

Fitments	For men	For women
Water - closets	1 for every 100 persons or part thereof.	2 for every 100 persons or part thereof.
Ablution taps	1 in each water closet.	1 in each water closet.
	1 water tap with draining arrangements shall be provided for every 50 persons or part thereof in the vicinity of water-closets and urinals.	
Urinals	1 for every 50 persons or part thereof.	
Wash basins.	4 for every 100 persons or part thereof.	1 for every 100 persons or part thereof.

...

(iii) Administrative Buildings, Medical Staff Quarters and Nurses Homes

Fitments	For Administrative Buildings.		For Medical Staff Quarters		For Nurses Homes (Hostel Type)
	For Men	For Women	For Men	For Women	
Water-closets	1 for every 25 persons or part thereof.	1 for every 15 persons or part thereof.	1 for 4 persons.	1 for 4 persons	1 for 4 persons or part thereof.
Ablution taps	1 in each water-closet.	1 in each water-closet.	1 in each water-closet.	1 in each water-closet.	1 in each water-closet.
	1 water tap with draining arrangements shall be provided for every 50 persons or part thereof in the vicinity of water-closets and urinals.				
Urinals	Nil upto 6 persons. 1 for 7-20 persons 2 for 21-45 - do- 3 for 46-70 - do - 4 for 71-100 - do - From 101 to 200 persons, add at the rate of 3 percent. For over 200 persons add at the rate of 2.5 percent.	-	-	-	-
Wash basins	1 for every 25 persons or part thereof.	1 for every 25 persons or part thereof.	1 for every 8 persons or part thereof.	1 for every 8 persons or part thereof.	1 for every 8 persons or part thereof.
Baths(with shower)	1 on each floor.	1 on each floor.	1 for 4 persons or part thereof.	1 for 4 persons or part thereof.	1 for 4-6 persons or part thereof.
Cleaner's Sink.	---------- 1 per floor, Minimum ----------				

12.10.4 Steam Supply: Central steam supply is planned where mechanised laundry exists, or else, steam supply for CSSD and theatre sterilizing units are provided by local boilers.

12.10.5 Fuel: The fuel for cooking may be either wood charcoal or gas. Burshane gas is increasingly used. It is advantageous in several ways. Storage is simple and occupies less space. Vessels do not get coated with soot. Hence cleaning becomes easy. It is economical since its expense can be regulated.

12.10.6 Refuse Disposal: The problem of refuse disposal in hospitals is aggravated by the character of the waste material and by the storage requirements prior to disposal. The mode of collection and disposal through municipal agencies as prevailing now is not satisfactory and rather detrimental to public hygiene. Incineration which assumes complete destruction and maximum safety, should be the accepted method of disposal. Incineration should be carried out in individual buildings. The most efficient and economical method will be to locate the incinerator plant at a distant place within the compound so that smoke emanating from the plant will not enter work areas.

Incinerators used for the disposal of radio-active wates must be according to the method approved by the Atomic Energy Commission.

12.11 Floor Heights:

12.11.1 We have come across hospital buildings with floor heights of as much as 14'. From any consideration, it is not necessary to have floor heights of more than 12'. For shed type construction, the height can be 9'. For cycle stands and garages, it need not be more than 8'.

12.11.2 It must be understood that higher floor heights add to the cost. With a lesser floor height the same comfort can be achieved, provided adequate attention is given to ventilation. We are therefore convince that there is no need for having more than 12' for any part of the hospital except the operating departments with viewing galleries.

12.12 Design Efficiency:

12.12.1 Design efficiency means the ratio of useable area to plinth area. The main object should be to realise the maximum proportion of work space in the building. For this purpose, it is suggested that the total built-up area may be split up into four categories, viz., useable area, service area, circulation area and wall and column area, and checked against the limits prescribed below:

	Load bearing structure	Framed Structure
Useable area	55% - 60%	60% - 65%
Wall area	10% - 15%	5% - 10%
Service area	3% - 5%	3% - 5%
Circulation area	25% - 30%	25% - 30%
Built-up area	100%	100%

Workshops, garages and cycle sheds should be considered separately.

12.13. Structural Planning:

12.13.1 The next consideration in planning is of structure. Suggestions for reduction in structural cost have been given in the report on 'Multi-storeyed Buildings' and 'Residential Buildings' of the Committee on Plan Projects. For shed type buildings, suggestions contained in the report on 'Storage Structures' shall be used.

12.14 Specifications.

12.14.1 The Panel observed that one of the factors contributing to high cost of hospital buildings had been the adoption of irrational specifications regardless of functional necessity. Specifications should be related to functional requirements and as far as possible the use of local materials should be encouraged to reduce cost of construction.

12.14.2 Hospital buildings should be simple and attractive. Aesthetic considerations, though desirable, should only be secondary to functional needs.

12.15 Fly-proofing:

12.15.1 Kitchen, pantry, lavatory and I.D. Wards should be provided with fly-proof wire gauge shutters opening inward and the ordinary shutters outwards.

12.16 Fire Protection:

12.16.1 Materials used for construction should be incombustible and fire resistive. Rooms containing mechanical equipment, boiler etc. should be planned with ceilings, clear off the equipment to avoid fire hazards.

12.16.2 Fire Alarm: Each building should be equipped with manually operated fire alarm system.

12.16.3 Fire Extinguishers: Fire extinguishers, suitable for the locality, should be provided to cope with fire at an incipient stage.

The size, type, and location of fire extinguishers should be established after consultation with local fire fighting authorities.

12.16.4 Evacuation: Inspite of all precautions taken to prevent fire, the possibility of its recurrence is not totally ruled out. The number, location, arrangement and construction of exits should be carefully planned to facilitate rapid evacuation.

12.17 Vehicle Parking:

12.17.1 Facilities for parking cars, garages and cycle stands must be adequately provided. Lean-to-roof sheds built over compound walls will be sufficient.

12.18 Stalls:

12.18.1 Provision of a sweet stall, a tea stall and a fruit stall will be useful. They should be constructed by hospital authorities and leased out.

12.19 Provision of Gates:

12.19.1. Provision of too many gates give rise to problems of controlling traffic. It is,therefore, recommended that the number of gates should be kept to the minimum.

12.20 Modernisation and Expansion of Old Hospitals:

12.20.1 Old existing hospitals generally become inadequate and call for expansion and modernisation. In its wake, there arises a demand for more area. In such cases we recommend that there should be no hesitation in shifting the hospital campus to the outskirts of the town where acquisition of adequate land will not be difficult. It must be understood that it would be economical and efficient to construct new buildings than to expand and remodel the existing ones.

12.20.2 Where land is available, expansion should be taken up on organised basis. A master plan should be evolved envisaging the ultimate development of the campus and the execution can be in phases. If this is not followed, one is apt to misplace facilities, as happened in a few cases, giving rise to perpetual inconvenience and increase in operational cost.

12.21 Residential Accommodation:

12.21.1 For the purpose of providing accommodation, the staff may be grouped under two categories, namely, (i) essential and (ii) non-essential. Where land is available, there is no problem; almost the entire staff will be provided with quarters. If, however, adequate land is not available, priority will have to be given in providing accommodation for the essential staff which may include the Resident Medical Officer, House Surgeons, Nurses and Inferior Servants. The scale of accommodation etc. are discussed under the Chapter on 'Residential Accommodation'.

12.22 Area:

12.22.1 The extent of land required for general hospitals of different bed capacities is as follows:

Category	Bed Nos.	Area (Acres)	Remarks
Health Centres	10	2 - 3	One floor plan
	25	5 - 7	One floor plan
	50	8 - 10	One floor plan
Sub-Divisional Hospitals.	75	10 - 15	One for two floor plan.
	100	15 - 20	One or two floor plan.
	200	20 - 25	Two floor plan
Divisional Hospitals	300	25 - 30	Two floor plan
	400	35 - 45	Two or three floor plan
	500	45 - 60	Two or three floor plan
City or Teaching Hospitals.	750	65 - 80	Three to seven floor plan
	1,000	85 - 100	Three to seven floor plan.

12.22.2 The assessment is based on the considerations that about $\frac{1}{3}$rd of the area will be covered by hospital, $\frac{1}{3}$rd will be covered by residential accommodation and the balance one third will be left open.

13. GENERAL HOSPITALS

13.1 The integrated scheme of medical care envisages setting up of district hospitals at district headquarters, sub-divisional hospitals in taluq headquarters and health centres in key villages. The district hospitals are intended to form the hub of the network of medical care services with facilities in order to serve the needs of services in the district, by providing the requisite clinical facilities in the hospital and extending supervisory and consultant facilities to sub-divisional hospitals and health centres. The sub-divisional hospitals should take care of the routine medical, surgical, obstetrical and gynaecological needs of the sub-division. The primary health centres should form the first line of defence, as a focal point for an integrated health service in the rural areas.

13.2 It is realised that it is not possible to provide a high standard of medical care at all levels of hospitals due to lack of resources and medical personnel. It is, therefore, especially, obligatory that greater emphasis should be laid on developing the district hospitals, so as to provide medical coverage to the population of the district in the most effective and economical way.

13.3 In this Chapter, we propose to deal with only 'General Hospitals' as the subject of 'Health Centres' has already been dealt with by the National Buildings Organisation.

13.4 Sub-divisional Hospitals:

13.4.1 Sub-divisional hospitals are located generally in taluq headquarters with a population of 25,000 to 1,00,000. The bed strength may vary from 25 to 100 depending upon the population under its command. On an average, a hospital of 50 beds should have, on its staff, at least three medical officers in charge of medicine, surgery and obstetrics and gynaecology. General medical, simple obstetrical, and minor and emergency surgical cases will be attended to adequately. For specialised diagnostic and treatment services, patients will be referred to the district hospitals. The sub-divisional hospital will, in turn, function as a referral centre for two to four health centres.

13.4.2 A laboratory, capable of handling all routine works other than seriology and culture should be provided. It may be placed under the charge of one medical officer who should have the assistance of a competent technician.

13.4.3 The services to be furnished in hospitals with 25, 50 and 100 beds are given in Appendix II.

13.4.4 Layout: Design of hospitals with beds upto 50 may follow one-floor plan, and above 50 and upto 100, may follow double storeyed construction. A 'H' plan is considered suitable for separation and grouping of facilities. This is illustrated in Plate No. 10.

Appendix

13.4.5 Land: The land requirement of hospitals of 25 to 100 beds in indicated below. It is based on the consideration that one third of the area will be covered by hospital buildings, one third by residential quarters and the remaining be left open.

Beds		Area (Acres)
25	.....	5 - 7
50	.....	8 - 10
75	.....	10 - 15
100	.....	15 - 20

13.5 District Hospitals:

13.5.1 In the present context, improvement of the hospital services at the district headquarters is the most important single step for providing better medical care for the people at large. Each district may have one or two such hospitals depending on its size.

13.5.2 The bed strength of these hospitals will vary between 100 and 500 depending upon the population of the town and population density in the neighbour-hood. The facilities of a district hospital should include ortho-paedics, eye, ear, nose and throat, paediatrics, dentistry skin and venereal diseases. The provision of psychiatric services should also be considered if there be need.

13.5.3 The laboratory and X-ray services at the hospital should be adequate for meeting the needs not only of the hospital itself but also of all units including the sub-divisional hospitals and the primary health centres dependent on it.

13.5.4 The major departments of a district hospital will be as follows:

i). Administration:

(a) Office.
(b) Medical records.

ii). Diagnostic and treatment facilities:

(a) Pathology department.
(b) Radiology department.
(c) Physio-therapy department.
(d) Operating department.
(e) Pharmacy.
(f) Out-patient clinics.
(g) Emergency & accident department.

iii). Nursing Unit:

(a) General Wards.
(b) Special Wards.

iv). Special Department:

(a) Maternity and gynaecology department.
(b) Paediatric department.
(c) Psychiatry department.
(d) Isolation unit.

v). Hospital Services:

(a) Central sterilization and supply department.
(b) Dietary.
(c) Laundry.
(d) Stores - liveries, drugs and furniture.
(e) Mortuary.

vi). Engineering Services:

(a) Water supply.
(b) Electricity supply.
(c) Sanitation.
(d) Steam supply.
(e) Air-conditioning.

vii). Residential accommodation:

13.5.5 District hospitals will be expanded to provide upto 500 beds. A comprehensive list of facilities with their sizes required for hospitals of 100, 300 and 500 beds is given in Appendix II. This will go a long way, to assist the authorities in planning of hospitals with speed and precision. It is not, however, intended to be absolutely rigid and imply dispensing with the need of a careful study of local needs and conditions which may necessitate modifications in the type and extent of facilities recommended.

13.5.6 Flow Chart: As stated earlier, the efficiency of a hospital depends more on functional planning i.e. arranging the facilities in a manner conducive to easy and quick communication between the different sections than merely determining the size of the individual facilities. The line plan, given in Plate No. 11. illustrates the functional relationship of the different sections.

13.6 Teaching Hospitals: Teaching hospitals offer the highest form of medical care services. Primary health centres, sub-divisional hospitals and district hospitals refer patients to the teaching hospitals for specialised investigations and treatment. It will take considerable time to develop district hospitals to a leve providing these services and as such the best solution appears to be to divide a state into zones, each of about 5 million population and provide a teaching hospital

at the centre of the zone to bring specialised services within the easy reach of the community.

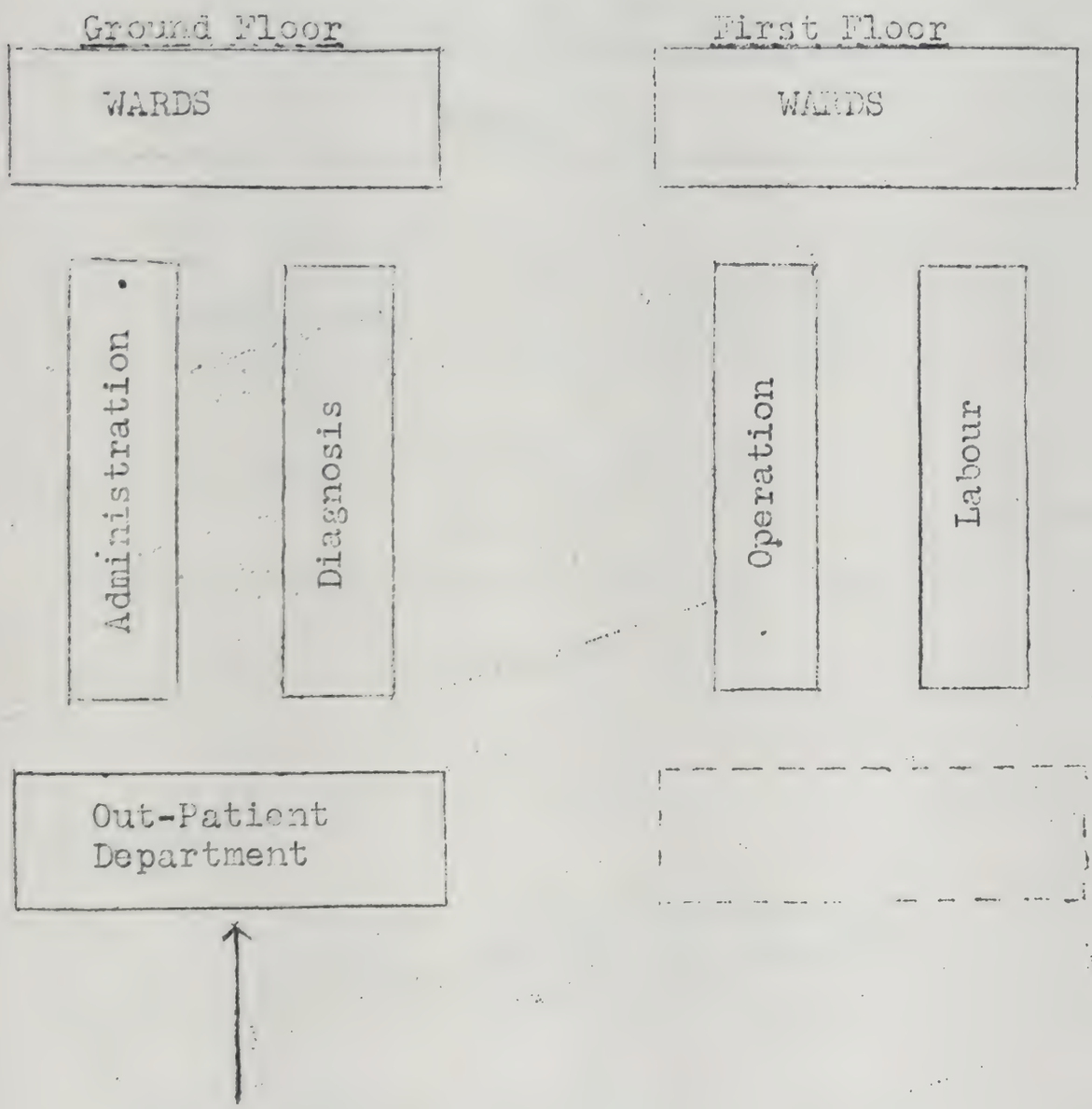
13.7 Distribution of Beds: Planning of hospital facilities should be, normally, based on one bed for every thousand of the population. However, in the hospitals attached to industrial towns the bed-population ratio may be higher as stated below:-

30 beds for 10,000 population. i.e. 3 per 1000
75 beds for 25,000 population. i.e. 3 per 1000
125 beds for 50,000 population. i.e. 2.5 per 1000
2 beds for every 1,000 for 1,00,000 population and above.

13.8 Special hospitals: Paediatric, Maternity, T.B., Mental, Cancer, Leoprosy hospitals etc. fall under this category. Although services in respect of these aspects are available in general hospitals, there exists a great need for providing improved and augmented facilities which would require special institutions. This Panel has not dealt with these hospitals in detail. However it is considered that the norms and standards given in this report will apply to a considerable extent, to these hospitals.

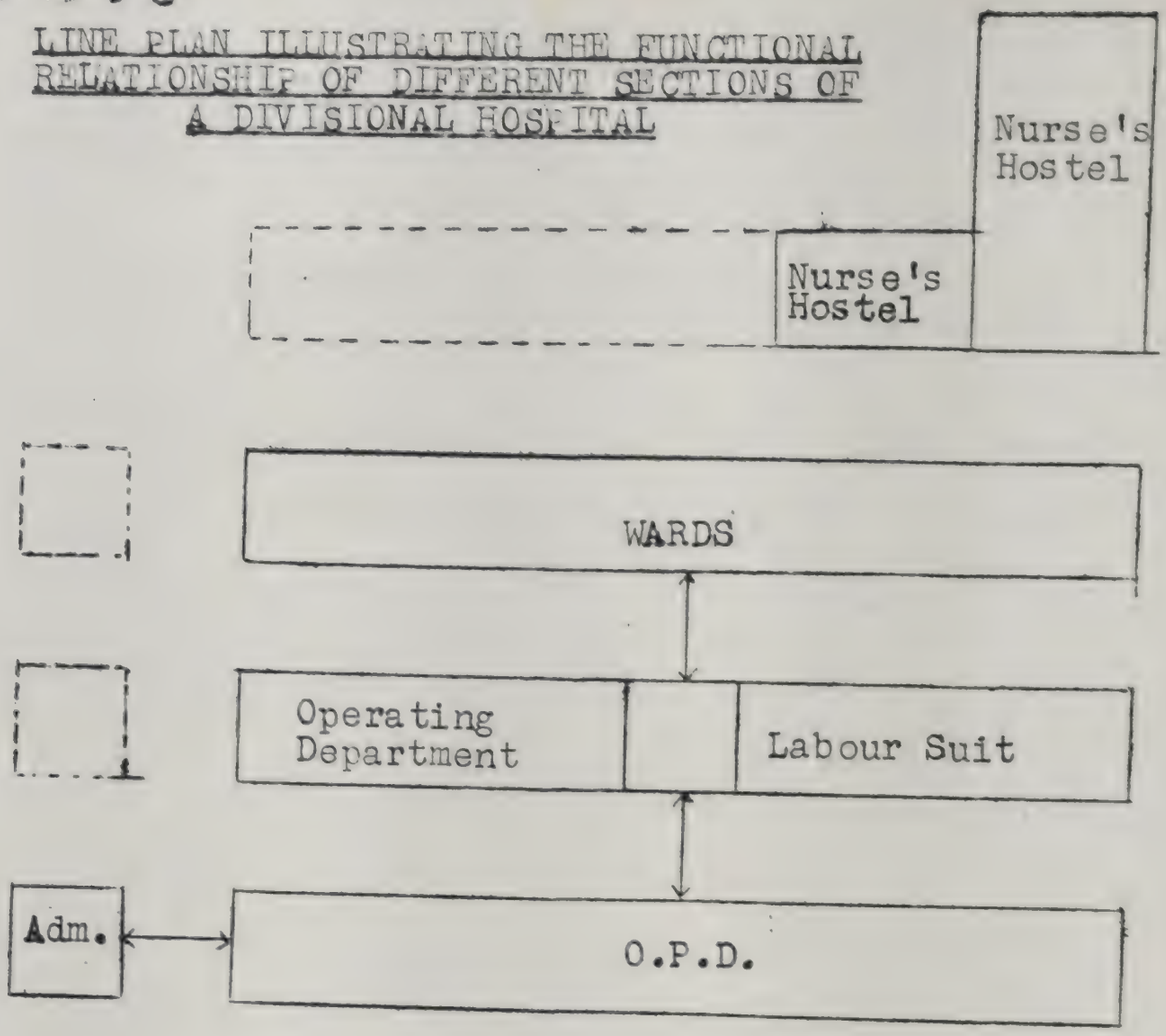
PLATE NO. 10
Para No. 13.4.4.

LAY-OUT FOR A SUB-DIVISIONAL HOSPITAL

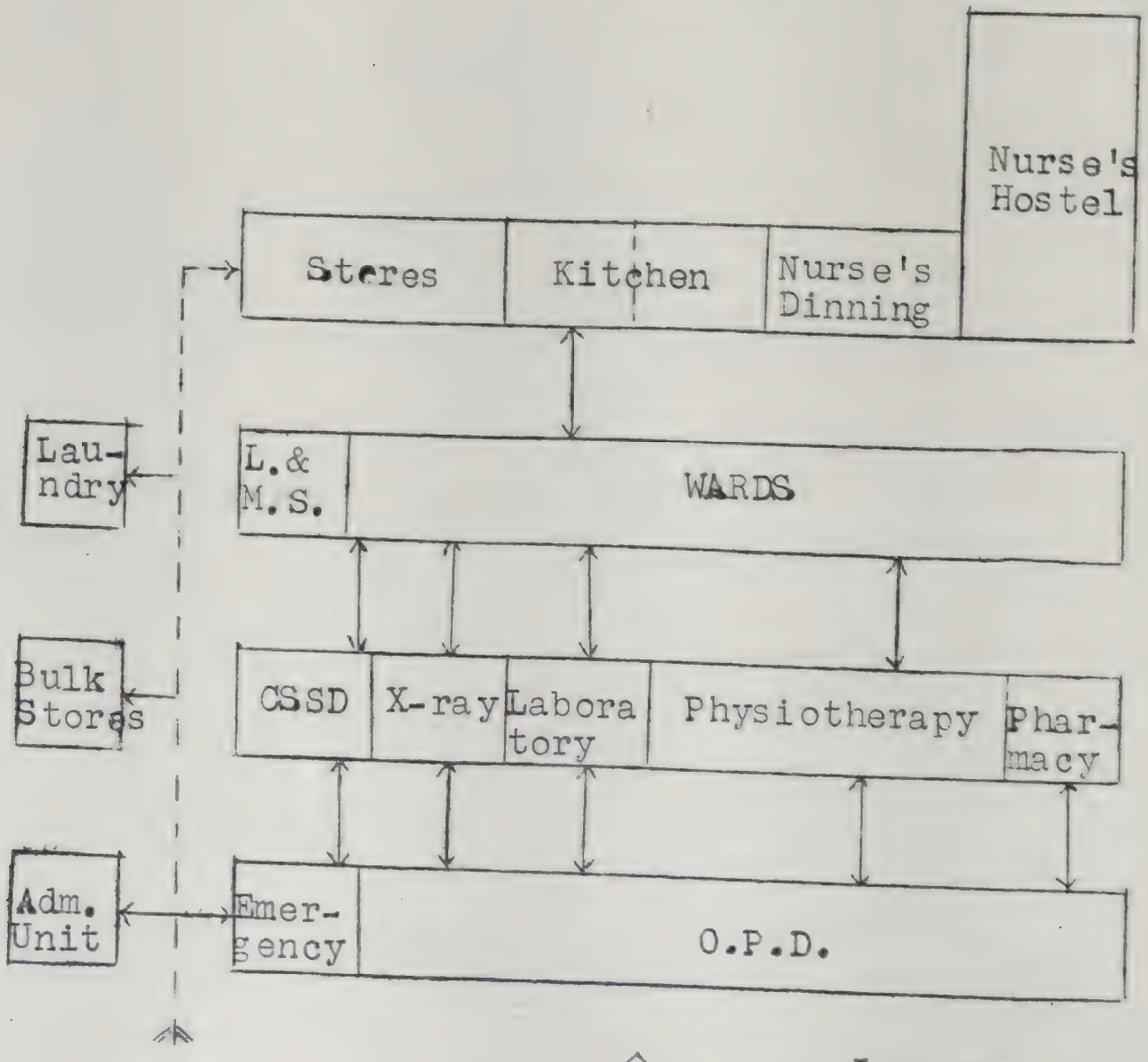


Para 13.5.6

LINE PLAN ILLUSTRATING THE FUNCTIONAL RELATIONSHIP OF DIFFERENT SECTIONS OF A DIVISIONAL HOSPITAL



First Floor



Legend:
L&M.S. = Linen &

14. RESIDENTIAL ACCOMMODATION

14.1 Residential Accommodation for Staff:.

14.1.1 The responsibilities of the staff of the hospital are such that their living close to the hospital is necessary. Although it is desirable to provide accommodation for the entire staff within the hospital campus, it cannot be accomplished on account of non-availability of land. In such cases, accommodation for the essential staff alone is planned within the campus and the rest are placed at the closest place available.

14.1.2 The Panel has observed great disparity in the scale of accommodation provided for different categories of staff. It varies from State to State and hospital to hospital. It is desirable that there should be, as far as possible, a uniform scale based on reasonable requirements of each grade of employees. We recommend the following

Type	Designation	Scale of accommodation		Remarks
		Floor Area Sft.	Plinth Area Sft.	
V	Superintendent of the Hospital (Large Hospitals)	1650	2000	Single storey detached.
			2100	Double Storey detached.
			450	Servant Quarters.
			225	Garages.
IV	Resident Medical Officer & Senior Assistant Medical Officer.	1450	1750	Single storey semi-detached.
			1850	Double storey semi-detached.
			225	Garage.
III	Junior Medical Officers.	1000	1200	Single storey semi-detached.
			1280	Double storey semi-detached.

Cont..

4.	II	Technicians & Clerks.	520	625	Single storey semi-detached.
				700	Double storey semi-detached.
5.	I	Inferior Servants (Class IV Staff)	240	345	Single storey semi-detached.
				370	Double storey semi-detached.

Note:-

(i) The plinth areas are for load bearing constructions using 9" bricks. These have to be slightly modified when other materials are used for different types of construction adopted or where seismic forces are to be encountered.

(ii) In laying down the scales of accommodation in this table, the pay scales adopt in the Central Medical Services have been taken into consideration.

(iii) The floor areas given in the table include all living, services & circulatio space within the house but exclude common circulation area (vertical and horizontal).

(iv) In case of multi-storeyed buildings (more than two storeys high) floor areas of the ground floor units will be as given in this table, while the plinth area may vary depending upon the number of storeys, type of construction and thickness of walls etc. Floor areas of units other than the ground floor, may be somewhat higher in some cases on account of reduced thickness of walls of the upper floors.

(v) In case of single and double storeyed houses from the point of view of financial control, the plinth areas as given in this table will be the governing factor.

(vi) Each house of types V & IV will have a garage. Quarters of type III will be provided with garages at the rate of one garage for two quarters. It would, however, be better to ascertain by a sampel survey the likely requirements. In any case space should be left in the lay out for constructing garages in the future.

14.1.3 For the same category of staff, the pay scales may differ from State to State. However, we recommend that scale of accommodation, as laid down in the table, should be adopted in respect of the different categories of staff irrespective of their scales of pay.

14.2 Planning and Construction of Residential Buildin

14.2.1 The unility of buildings, depends not on what area is given but on how it is given. The Committee on Plan Projects has made detailed studies of residential buildings and has brought out a report. It includes recommendations on different aspects of residential planning and construction, such as, layout, orientation, space utilisation, materials, amenities to be provided, methods for reducing cost of construction etc. This report can be usefully referred to by the authorities incharge of planning and construction of residential buildings for medical colleges and hospitals. For immediate reference, a summary of important recommendations of the report is given in Appendix IV.

14.2.2 In general, the design of the building should be such that for a given plinth area the degree of liveability is maximum. Sufficient care should be taken with regard to positioning of doors and windows and in fixing the size and shape of the room so that their usefulness is not impaired.

14.2.3 As regards space utilisation, the break-up of figures as recommended in the report on "Residential Buildings" for load bearing construction are given below:

Cont./--

a) Living space (Living, dining & bed room)	47-50%
b) Service space (kitchen, bath & w.c.)	15-20%
c) Horizontal circulation (passages & verandahs).	10-12%
d) Vertical circulation space (stair cases).	4-7%
e) Walls and columns.	15-17%

Every effort should be made to work to these limits.

14.3 Hostel Accommodation for Interness and House Surgeons and Registrars.

14.3.1 In a large hospital it will be necessary to plan accommodation for interness, registrars and house surgeons in the hospital complex. It may be provided in a separate building or on the top floor of the ward block itself.

14.3.2 The size of the individuals' rooms may be 110-120 sft. Toilet facilities will be common.

14.3.3 Registration will have a room of 140 sft. with independent sanitary facilities.

14.4 Nurses Accommodation:

14.4.1 Residential accommodation for a major proportion of nursing staff is essential and has to be provided close to the hospital in the form of students' hostel. It may consist of single and three seated rooms. Two seated rooms are not recommended.

14.4.2 The physical facilities to be provided in the hostel will include:

a) Entrance Hall
b) Bed-cum-sitting Rooms for Nurses & Sisters.
c) Baths and WCs.
d) Utility Room.
e) Kitchen
f) Common Room(s)
g) Janitor Room.
h) Office Room.
i) Linen Room.
j) Sick Room
k) Matron's Apartment.
l) Circulation Area.

14.4.3 The function and size of these facilities will be as follows:-

(a) Entrance Hall: This should be made functional. The size should be adequate to accommodate two telephone booths, three or four visitors waiting, lavatory and space for circulation. About 300 sft. should suffice.

(b) Bed-cum-sitting Room for Nurses and Sisters:

The size of the rooms should be slightly larger than that of the students. Each nurse should be provided with a bed, a table and a built-in cupboard. It is considered advantageous, if every room is provided with a wash basin.

The size of the single rooms may be 110 to 120 sft. and that of the three seated rooms be 320 sft. The senior or head nurse may be provided with single rooms and for the junior nurses, accommodation may be provided on a floor or in a wing attached to the ward. In large hospitals, it will be necessary to provide an independent hostel.

Sisters should have a room of 140 sq.ft. with sanitary facilities common between two rooms.

(c) Baths and Water Closets: Common baths and wcs. are recommended for the nurses' hostel. The scale recommended for students' hostels may be followed.

(d) Utility Room: Contiguous to the bath rooms, may be placed utility rooms with facilities for washing, drying and ironing. The size of the same may be about 240 sft. Where students do not have to wash clothes themselves, this facility is not required.

(e) Kitchen: A well equipped kitchen is a necessity. The size of the kitchen and of ancillary facilities may be according to the scale recommended for the students' hostel.

The dining hall may be designed to accommodate at one time about two thirds the ultimate strength which may be 200.

(f) Common Room: A lounge of size about 300 to 400 sft. will be useful for relaxation and entertainment of visitors. It can be advantageously located in the ground floor near the entrance hall.

(g) Janitor's Room: This may be either designed as a separate room or improvised. The space below the 'landing' of a staircase is quite suited for the purpose. If it is an independent room, the size may be 60 sft.

(h) Office Room: This is the administrative unit of the hostel which may be under the charge of a sister. The size of the room may be about 120 sft.

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and situated close to the entrance.

(i) Linen Room: The sister's room may be attached with a store room for keeping new dresses. The size may be about 120 sft. for about 100 nurses.

(j) Sick Room: Though the hostel will be in close proximity to the hospital, the provision of a sick room becomes necessary to accommodate persons suffering from casual indisposition which does not require hospitalisation. A hostel with about hundred occupants will require a four bedded cubicle and a single room for isolation. A doctor's cubicle is desirable where the medicine chest may also be kept. The area of the sick unit will be about (360+100+120=580) or 600 sft.

(k) Matron's Apartment: Matron is the warden of the hostel. She is provided with apartment which will include a drawing-cum-dining room, bed room kitchen and lavatory. Its size may be about 720 sft.

(l) Circulation Area: The circulation area may be about 20% of the built-up area. Corridor pattern is recommended.

14.4.4 Built-up Area: The built-up area of the complex may be such that it is not more than 2.5 times the total carpet area of the living rooms.

14.4.5 Location: Nurses' premises should preferably be located as near the wards as possible. It would be an additional advantage if the floors of the hospital and hostel are kept at the same levels, minimising vertical circulation.

14.4.6 Scale of Accommodation:

S.No.	Description of facilities	No.	Area in sq.ft.	Remarks
	Physical facilities			
1.	Entrance hall	1	300	
2.	Bed-cum-sitting rooms			
	(a)" " (single seated)	1	110 to 120	
	(b)" " (double seated)	1	320	
3.	Utility room	1	240	
4.	Kitchen, Stores and Dining.	-	20 sft. per person and for 2/3rds of the strength.	
5.	Common Room	1	300 to 400 (one in each floor).	
6.	Janitor's Room	1	60	
7.	Office Room	1	120	
8.	Linen Room	1	120	(This area is for about 100 nurses.
9.	Sick Room	1	600	-do-
10.	Matrons Apartment	1	720	

15. NURSING SCHOOL

15.1 There is a dearth of nursing staff in the country. Lack of adequate facilities for training is one of the reasons for the shortage. The deficiency is such that every hospital with more than 200 beds can, with advantage, conduct nursing educational programmes.

15.2 The strength of the school will vary with the bed strength of the attached hospital. A hospital with 500 beds may entertain upto 100 trainees at a time. They will be divided into groups of sixteen to twenty. The facilities in the school will include:

(i) Office
(ii) lecture rooms
(iii) laboratories
(iv) library
(v) students' quarters and ancillaries.

15.3 Lecture hall:

15.3.1 One large lecture hall sufficient to accommodate the entire student population at a time. This should be provided with projection equipment and demonstration facilities.

15.3.2 In addition, one or two small lecture rooms adequate to accommodate 16 students at a time are needed.

15.4 Laboratories: (a) One science laboratory room can accommodate 16 students at a time. Its size will be 480 sft. Area required per seat is 28 to 30 sft.

(b) One nursing arts classroom to accommodate same number. This room will have 8 beds and its size may be about 640 sft. @ 80 sft. per bed.

(c) One dietetic laboratory to accommodate same number of students as science room. Its size may be 480 sft. @ 30 sft. per seat.

15.5 Library:

15.5.1 One library to accommodate about one fourth of the student body at a time. For stacking and reading, a room of size 800 to 1000 sft. will be required for a student body of 100.

15.6 Hostel accommodation:

15.6.1 The students' quarters are proposed to be of three seated rooms for economy, although single rooms are preferred from consideration of morale, maintaining good standards of health and better conditions for study. For the design of hostels, readers may refer to the report on 'Hostels' published by the University Grants Commission. The summary of recommendations of the above report is given in Appendix V .

APPENDIX - I.
Para Nos. 2.1.1, 2.16.3, 2.21.1, 2.22.4, 10.1.6

WORKSTUDY IN HOSPITAL PLANNING AND ADMINISTRATION :

Though work study started with industry, its development in recent years is such that it can cover almost all fields of human activities. It has extended certainly well beyond industry proper into the fields of agriculture, hospital management, public administration etc. The hospital Administrative Staff College in London conducts special courses on work study with particular reference to hospital planning and management. Workstudy has also been introduced in the general courses on hospital administration conducted by this Staff College. Workstudy groups have been set up in several big hospitals. Smaller hospitals have been grouped to have the benefit of a workstudy cell. The practical assignments carried out by these workstudy groups have paved the way for numerous improvements in the layout and day to day management of hospitals.

The Committee on Plan Projects which among many other topics is also considering the possibility of reducing cost on medical colleges and hospitals in the country has carried out a few workstudy assignments in certain hospitals. Some of the pilot studies conducted proved beyond doubt the efficacy of this technique in indentifying the real problems in hospital administration and suggesting remedies thereof. A few of these studies are described in the subsequent paragraphs.

I- Over-crowding in out-patient departments

It is a common complaint everywhere that the out patient departments are over-crowded and that patients have to waste considerable part of their time in waiting at

different places. In one case where there was a feeling of over-crowding in verandahs, the decision was taken to have wider verandahs in future construction. The existing verandah itself was 11'-3" wide.

A study was initiated in this out-patient department and to start with, the flow of people was traced. The flow pattern is indicated in chart (1). It is evident from the chart that there is considerable flow of people in the verandah which creates a sense of over-crowding. But the study also showed that the over-crowding was due to wrong placing of certain facilities such as injection room, casualty department etc.

The location of the casualty department in this particular building was such that emergency cases had to be taken through the same entrance and through the same hall used for registration of out-patients. The injection room was so placed that patients had to traverse the verandah several times. A suggestion was made to shift the injection room and locate it near the dispensary to avoid this unnecessary loop in the movement of patients. Similarly an independent entrance to the casualty department would reduce traffic through the main hall and mitigate the problem of crowding. With these changes, the existing width of verandah itself was considered more than adequate. As a matter of fact, it was proved that it could be reduced to 10' in future designs.

II - Over-crowding in registration waiting hall

In another case of this type studied by us, the problem was of over-crowding in the main registration hall. Even the provision of a huge hall of 7,840 sft. area was found to be inadequate. There was a proposal to extend the hall to meet with the requirements. In the work study assignment which we took at that time, we first observed the number of people waiting at any point of time. Similar observations were carried out in certain other out-patient departments of similar nature. Chart (2) gives graphs indicating the number of people waiting at any point of time in the two out-patient departments. Though the total attendance for both the out-patient departments was more or less same, the number of people waiting at a time was 5 times more in one case than the other. A further study led us to the conclusion that this 'Bulge' in the first case was due to the restricted registration period. The registration period in this case was hardly 2 hours against 4½ hours in the other case. We, therefore, suggested that the registration period should be extended. The authorities incharge accepted the proposal and the effect was a sudden flattening in the curve depicting the people waiting at a time. Incidentally this reduced the density of work at the registration counter and it was possible to divert some of the clerks for work elsewhere.

These cases indicate how only workstudy can spot-light the real cause of the problem and suggest adequate remedial measures. Increasing the number of doctors or extending the hall would have only added to the cost and

could not have solved the problem.

III - Study of dispensing section

In another out-patient department studied by us, the problem was one of over-crowding again at the dispensing section. The rate of dispensing was so low that there were complaints. A proposal was mooted to increase the waiting area. A detailed work study was instituted by us and in the first instance, we tried to see the pattern of movement of compounders within the dispensing section. In spite of the fact that the section itself had a huge area, the arrangement within was such that it led to confused flow pattern as can be seen from figure 1, Chart(3). Continued observations were taken of the movement of three compounders. The actual pattern of the movement for instance is depicted in chart (4). In a period of one hour and 50 minutes, the compounders had to move between 2300 to 3150 ft. The confusion of flow pattern within was again aggravated due to the prevalent system of issuing tablets by one of the compounders. This led to a queuing within the section itself. A suggestion was made to improve the situation in two stages. The layout pattern for the two stages are shown in figures 2 and 3 of Chart(3). The movement pattern of the compounders in the proposed set up are again shown in Chart (4). In the first stage of improvement, the compounders will have to traverse only 500 to 900 ft. whereas in the second stage of improvement hardly they will have to traverse 80 to 200 ft. It was also proposed to open out more counters and provide independent shelves to each counter. In so doing, we also made an A-B-C analysis of

the prescriptions so that the most repeated medicines could be kept very close to the compounders and the less used ones separately as shown in the lay out diagram. The proposal has been accepted and is being put into effect. The authorities themselves feel that there will be considerable improvement in the dispensing services consequent on the modifications proposed.

Consequent on the revision of layout, some area of the dispensing section was put for allied use. Thus a detailed work study has not only led to improved dispensing section but also to better space utilisation.

In the absence of such a study, one would have been carried away by the fact of over-crowding and would have gone on to add more area. It is not possible to identify the real cause unless a detailed study is made of the situation and flow charts prepared and analysed.

IV - Study of hospital kitchen

This study relates to a hospital kitchen where the problem was one of crowding, lack of facilities for washing, difficulty in transport of food trollies etc. As there was a proposal to extend the kitchen facilities, it was considered worthwhile to study the flow of work in the existing kitchen and make suggestions for improvement so that some modifications can be effected in the existing kitchen itself and lay out pattern evolved for future adoption. The particular kitchen under study caters to about 700 patients. The movements involved within the kitchen are those of fuel, milk, vegetables, provision and food trollies. The flow pattern of these is shown in figure 1, Chart(5). The study

of the pattern highlights the following deficiencies:-

1) The fuel store is at two different places and these are not properly located with regard to the kitchen. This necessitates unnecessary movement in the corridor in addition to dirtying it, which is objectionable. The provision for keeping gas cylinders is unsatisfactory.

2) The weighing of materials for day to day use involves long movements.

3) The location of the provision store and the special kitchen are not in conformity with the flow of work. There is a huge accommodation for dietitian which is not called for and this could be put to better use.

4) The rest room for the workers was inadequate.

5) There was no space for keeping the food trollies. These were kept in the corridor and the clean trollies were stationed at a place close to the washing and the fuel store where there is every possibility of their getting contaminated.

6) The washing area is so located that flow of utensils and trollies becomes involved leading to crowding in the corridor.

7) There is no provision for a separate pantry.

It is difficult to remove all the deficiencies in a existing kitchen as there are certain structural limitations. Keeping this in view certain suggestions were made which would mitigate the deficiencies to an appreciable extent. The modified lay out with the lines of flow is shown in figure 2 Chart(5). The improvements will be apparent. A few of them are however highlighted below:-

(1) By introducing a small weighing machine, the unnecessary movement of provision and vegetables to and from for day to day issue is eliminated.

(2) The provision store and the vegetables stores are so located that the store keeper can have good control. Further, the materials can be directly taken to the kitchen.

(3) The special kitchen and the main kitchen have been grouped together with a pantry interposed which is a definite improvement. In the revised plan, however, the dietitian can have direct control over the special kitchen which ought to be the case.

(4) An alcove has been provided for the trollies and this is close to the pantry from where these can be directly loaded on.

(5) More accommodation has been set apart for the workmen's rest room etc.

(6) The fuel section has been grouped in such a way that fuel movement is minimised and this section has direct access to the kitchen.

The difference between the revised and the old lay-out can be judged from the advantages listed above and the general streamlining of the flow of work. It should be mentioned that ordinary visual inspection will not bring to light all the deficiencies as a detailed charting of the various movements qualitatively and quantitatively can.

APPENDIX II

Para Nos. 2.10.2
13.4.3
13.5.5

Schedule of Facilities for Hospitals with 25 to 600 Beds

Name of facility	500-Beds	300-Beds	100-Beds	50-Beds	25-Beds	Remarks
A. Specialist Facilities						
1. Surgery	Surgery	Surgery	Surgery	Surgery	Surgery	
2. Medicine	Medicine	Medicine	Medicine	Medicine	Medicine	
3. Orthopaedics	Orthopaedics.	Orthopaedics.	-	-	-	
4. E.N.T.	E.N.T.	E.N.T.	E.N.T.	E.N.T.*	-	*Optional.
5. Paediatrics	Paediatrics.	Paediatrics.	-	-	-	
6. Dermatology	Dermatology	Dermatology	-	-	-	
7. Obstetrics	Obstetrics	Obstetrics	Obstetrics	Obstetrics	Obstetrics	
8. Ophthalmology	Opthalmology	Opthalmology	Opthalmoloy	-	-	
9. Dentistry	Dentistry	Dentistry	Dentistry	Dentistry*	Dentistry.*	*Optional
10. Psychiatry	Psychiatry	Psychiatry*	-			*Optional.
Total No. of Facilities:	10	10	6	5	4	

Name of facility	500-Beds	300-Beds	100-Beds	50-Beds	25-Beds	Remarks
B. Distribution of Beds(approx.)						
1. Men (Medicine & Surgery)	200	120	40	22	10	This includes 2-4 bedded Psychiatric observation wards.
2. Women (Medicine & Surgery)	175	105	35	20	10	
3. Women (Obstetrics & Gynaecology)	75	45	15	8	5	
4. Children	50	30	10	-	-	

PART - B

Name of facility	500-Beds		300-Beds		100-Beds		50 Beds		25 Beds		Remarks
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	
Administrative Unit (1.2)											
1. Medical Superintendent (with toilet)*	1	240	1	240	1	240	1	240	1	240	
2. Asst. Medical Superintendent.	1	240	1	240		-		-		-	
3. Private Secretaries to the MS & AMS	1	180	1	180		-		-		-	
4. Administrative Officer.	1	180	1	180		-		-		-	
5. Library - Cum - Conference Room.	1	500	1	400	1	300		-		-	
6. Waiting Rooms	1	240	1	240	1	180	1	180	-	-	
7. (a) Manager & Clerical Staff (@ 60 sft. per clerk).	1	600	1	420	1	320	1	240	1	240	
(b) Toilet	1	120	1	120	1	120	1	120	1	120	
(c) Strong Room	1	120	1	120	-	-	-	-	-	-	
8. Stationery & Records	1	300	1	300	1	200	1	200	1	200	

Name of facility	500-Beds		300-Beds		100-Beds		50 Beds		25 Beds		Remarks
	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	
9.Furniture Stores	1	500	1	400	1	300	1	240	1	240	
10.Medical Stores	1	500	1	400	1	300	1	240	1	240	
11.Linen & Mattress Stores	1	500	1	400	1	300	1	300	1	240	
12.Engineering Stores.	1	500	1	400	1	320	1	240	1	240	
Total:		4,720		4,040		2,580		2,000		1,760	
b.											
13.Garage (without partition).	8	1,200	6	900	4	600	3	450	2	300	Each garage of 150 sft.
14.Cycle Stand(covered).		120	20	120	20	120	10	60	10	60	
Total:		1,320		1,020		720		510		360	
c. Miscellaneous											
15.Ambulance Garage with door.	3	600	3	600	3	600	1	200	1	200	Plinth Area
16.Drivers Quarters	2	740	2	740	2	740	1	370	1	370	-do-
Total:		1,340		1,340		1,340		570		570	

PART - B - Out-patient Department.

Name of facility	Number of out-patients								Remarks
	1000-1200		700-900		400-600		200-300		
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
General (2.21)									
1. Entrance Hall	1	1000	1	800	1	600	1	300	
2. Registration Booths.	4	240	4	240	2	120	1	120	
3. Enquiry	1	80	1	80	1	80	-	-	
Total:		1,320		1,120		800		420	
Clinics									
Surgery (2.3.1) (15-20%)									
1. Consultation & Examination.	2	320	2	320	1	160	1	160	
2. Treatment-cum-Dressing.	1	180	1	180	1	180	1	120	
3. Waiting	1	640	1	480	1	320	1	180	
Total:		1,140		980		660		460	

P

Name of facility	Number of out-patients 1000-1200		700-900		400-600		200-300		Remarks
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Orthopaedic (10 - 15%) (2.8)									
1. Consultation & Examination.	1	180	1	180	1	180	-	-	
2. Plaster & Splint room.	1	120	1	120	1	120	-	-	
3. Fracture & Treatment Room.	1	180	1	180	1	180	-	-	
4. Recovery Room.	1	120	1	120	1	120	-	-	
5. Waiting	1	480	1	320	1	200	-	-	
Total:		1,080		920		800	-	-	
E N.T. Clinic. (4 - 6%) (2.5)									
1. Consultation & Examination.	1	180	1	180	1	180	1	180	
2. Treatment	1	120	1	120	1	120	1	120	
3. Audiometric Room**	1	120	1	120					**To be provided in Divisional Hospitals or above

Contd.....

Name of facility	Number of out-patients 1000-1200		700-900		400-600		200-300		Remarks
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10
4. Waiting	1	160	1	120	1	120	1	120	
Total:		580		540		420		420	
Dental clinic (4-6%) (2.9)									
1. Consultation, Examination & Treatment.	1 (2 charis)	180	1 (2 chairs)	180	1 (2 chairs)	180	1 (2 chairs)	180	
2. Office attached to item No.1 above.	1	120	1	120	1	120	1	120	
3. Recovery	1	150	1	150	1	150	1	120	
4. Waiting	1	160	1	120	1	120	1	120	
Total:		610		570		570		540	

Name of facility	Number of out-patients 1000-1200		700-900		400-600		200-300		Remarks
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10
Eye Clinic (4-6%) (2.6)									
1. Consultation, Examination & Refraction.	1	240	1	240	1	240	-	-	
2. Dark Room	1	80	1	80	1	80	1	80	
3. Waiting	1	160	1	120	1	120	1	120	
Total:		480		440		440		200	
Medicine (20-25%) (2.4)									
1. Consultation & Examination.	3	480	2	320	2	320	1	160	
2. Cardiographic Examination.	1	150	1	150	1	150	1	150	
3. Waiting	1	800	1	600	1	400	1	200	
Total:		1,430		1,070		870		510	

Name of facility	Number of out-patients								Remarks
	1000-1200		700-900		400-600		200-300		
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	
1.	2.	3.	4.	5.	6.	7.	8	9.	10
Paediatric (15-20%) (2.10)									
1. Consultation & Examination.	3	450	2	300	1	150	-	-	
2. Dressing, treatment and dispencing.	3	360	3	360	3	360	1	120	
3. Waiting & Play Room	1	640	1	480	1	320	-	-	
4. Toilet	1	80	1	80	1	80	-	-	
Total:		1,530		1,220		910		120	
V.D.& Skin (9-10%) (2.7)									
1. Consultation & Examination.	1	180	1	180	1	180	-	-	
2. Treatment	2	240	2	240	2	240	-	-	
3. Waiting	1	320	1	200	1	180	-	-	
4. Superficial Therapy	1	120	1	120	-	-	-	-	
5. Dressing Booths	2	60	2	60	-	-	-	-	
Total:		920		800		600		-	

Name of facility	Number of out-patients								Remarks
	1000-1200		700-900		400-600		200-300		
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Injection (2.17)									
1. Treatment.	1	120	1	120	1	120	1	120	
2. Waiting(20 persons)	1	160	1	160	1	160	-	-	
Total:		280		280		280		120	
Dispensary (Pharmacy) (2.16)									
1. Stores (Drugs)	1	200	1	200	1	200	1	180	
2. Pharmacy Office	1	120	1	120					
3. Preparation Compounding & Dispensing.	1	320	1	320	1	240	1	180	
4. Waiting	1	480	1	320	1	240	1	240	
Total:		1,120		960		680		600	

Name of facility	Number of out-patients 1000-1200		700-900		400-600		200-300		Remarks
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10
Family Planning	2	180	2	180	1	180	1	180	
	-	180		180	-	-	-	-	
Total:		360		360		180		180	
Social Worker (Public Health) (2.14)	1	240	1	240	1	180		-	
Total:		240		240		180		-	
Emergency and Minor Surgery (2.15)									
1. Reception & Waiting	1	200	1	200	1	120	1	200	
2. Examination	2 (each 80)	160	2 (each 80)	160	1	120			
3. Treatment	1	240	1	240	1	150	1	150	
4. Operation	1	320	1	320	1	320	1	260	
5. X-Ray Examination	1	80	1	80	1	80	-	-	
6. Sterilizing	1	100	1	100	1	100	1	80	
7. Scrub-up	1	100	1	100	1	100	1	80	
8. Wash	1	100	1	100	1	100	1	80	

Name of facility	Number of out-patients 1000-1200		700-900		400-600		200-300		Remarks
	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10
9. Doctor's Room with toilet.	1	250	1	250	1	250	1	250	
10. Nurses Duty Room with toilet.	1	160	1	160	1	160	-	-	
11. Emergency Ward.	1 (4-beds)	320	1 (4-beds)	320	1 (2-beds)	180	1 (2-beds)	180	For emergency cases.
12. Minor Surgery Ward.	1 (4-beds)	280	1 (4-beds)	280	1 (2-beds)	160	1 (2-beds)	160	For normal cases.
13. Toilet	1	120	1	120	1	120	1	120	
14. Police Guard Room	1	160	1	160	1	160	-	-	
15. Stores	1	200	1	200	1	200	1	200	
16. Retiring room for Driver. (with toilet).	1	160	1	160	1	160	1	120	
Total:		2,950		2,950		2,480		1,880	

Name of facility	Number of out-patients 1000-1200		700-900		400-600		200-300		Remarks
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Blood Bank (2.18)									
1. Reception and waiting.	1	120	1	120	1	120	1	120	(Blood bank facilities (should normally be pr (vided in District (Hospitals and exceptio (ally in Sub-divisional (Hospitals.
2. Toilet	1	40	1	40	1	40	1	40	
3. Bleeding	1	120	1	120	1	120	1	120	
4. Laboratory	1	120	1	120	1	120	1	120	
5. Storage	1	40	1	40	1	40	-	-	
6. Recovery	1	120	1	120	-	-	-	-	
7. Office room	1	120	1	120	-	-	-	-	
8. Toilet	1	40	1	40	-	-	-	-	
Total:		720		720		440		400	
Over all Total O.P.D.		14,760		13,170		10,310		5,850	

PART - C

Diagnostic Unit

Name of facilities	500- Beds		300 Beds		100 Beds		50 - Beds		25 Beds		Remarks
	No.of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No.of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Laboratory (2.19)											
1. Office	1	200	1	200	1	-	-	-	-	-	*Not to be provided if provision is made under Medical Clinic.
2. General laboratory	1	400	1	300	1	300	1	300	1	300	
3. (a) Bacteriology and Seriology labs.	1	200	1	200	-	-	-	-	-	-	
(b) Kitchen	1	120	1	120	-	-	-	-	-	-	
4. Washing, Sterilizing and Storage.	1	150	1	150	1	120	1	120	1	120	
5. E.K.G. Room*	1	240	1	240	1	200	-	-	-	-	
6. Toilet	2	60	2	60	2	60	2	60	2	60	
7. Storage	1	120	1	120	1	80	-		-	-	
8. Reception Area	1	150	1	150	1	120	-	-	-	-	
		1,640		1,540		880		480		480	
Radiology (4.3.5)											
Radiography											
1. Radiography and Fluoroscopy.	2	300	2	300	1	150	1	150	1	150	
	1	400	-	-	-	-	-	-	-	-	
2. Chief of the Unit.	1	180	1	180	1	120	1	120	1	120	
3. Film Storage	1	80	1	80	1	80	1	80	1	80	
4. Waiting	1	160	1	160	1	100	1	100	1	100	
5. Registration Counter	1	100	1	100	1	80	1	80	1	80	
6. Dark Room	1	100	1	100	1	100	1	100	1	100	
7. Film Drying	1	100	1	100	1	80	1	80	1	80	

Name of facility	500 Beds No of Rooms	500 Beds Area in Sft.	300 - Beds No. of Rooms	300 - Beds Area in Sft.	100 Beds No.of Rooms	100 Beds Area in Sft.	50 Beds No.of Rooms	50 Beds Area in Sft.	25 Beds No.of Rooms	25 Beds Area in Sft.	Remarks
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
8. Film Developing Area.	1	80	1	80	1	80	1	80	1	80	
9. Barium Meal and Injection.	1	120	1	120	1	100	1	100	1	100	
10. Janitor's Room (alcove)	1	60	1	60	1	60	1	60	1	60	
B. Radio Therapy											
11. Patients Waiting Room.	1	160	1	160	1	100	1	100	1	100	
12. Physician's Room	1	160	1	160	1	120	1	120	1	120	
13. Contact Therapy Room.	1	120	1	120	1	120	1	120	1	120	
14. Superficial and Intermediary Therapy (including control desk and Dressing cubicle)	1	200	1	200	1	180	1	160	1	160	
15. Deep Therapy	1	200	1	200	1	180	1	160	1	160	
16. Cobalt Therapy	-	300	-	300	-	240	-	240	-	240	
17. Control Rooms	1	100	1	100	1	80	1	80	1	80	
18. Waiting Rooms with toilet	2	300	2	300	2	240	2	240	2	100	
19. Office											
(a) Specialist	1	150	1	150	1	120	1	120	1	120	
(b) Staff	1	150	1	150	1	120	1	120	1	120	
Total:		3,520		3,120		2,450		2,410		2,270	

Name of facilities	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Autopsy										
1. Chemical Storage	1	60	1	60	1	60	1	60	-	-
2. Inquest	1	120	1	120	1	120	1	120	-	-
3. Cold Storage	1	80	1	80	1	80	1	80	-	-
4. Autopsy	1	240	1	240	1	240	1	240	-	-
5. Shower	1	60	1	60	1	60	1	60	-	-
6. Body preparation with wash.	1	120	1	120	1	120	-	-	-	-
7. Relatives waiting.	1	120	1	120	1	120	-	-	-	-
8. Toilet	1	60	1	60	1	60	1	60	-	-
Total:	860		860		860		620		-	

Name of facilities	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Therapeutic Unit (5)										
1. Therapists Office and Examination.	1	300	1	300	1	200	1	200	-	-
2. Theraphy Booths	4	320	4	320	3	240	2	160	-	-
3. Exercise	1	640	1	400	1	400	1	400	-	-
4. Heat and Electric Theraly	2	160	2	160	1	80	1	80	-	-
5. Waiting	2	200	2	200	1	200	1	120	-	-
6. Occupational Therapy	1	400	1	400	-	-	-	-	-	-
7. Hydro Therapy (Tanks)	1	400	1	400	1	200	1	200	-	-
8. Toilet	2	100	2	100	2	100	2	100	-	-
9. Stores	1	320	1	240	1	200	1	200	-	-
10. Dressing cubicles	2	160	2	160	1	80	1	80	-	-
Total:		3,000		2,680		1,700		1,540	-	-

Name of facility	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.	No.of Rooms	Area in sft.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Operating Department										
1.(a) Theatre Major (18'x18')	5	1,950	3	1,300	1	325	1	325	1	325
Minor (18'x18')	2	650	1	325	1	325	-	-	-	-
2. Sterilization.	4	400	3	300	2	200	1	100	1	100
3. Scrub-up	4	320	3	240	2	160	1	80	1	80
4. Fracture theatre (18'x18')	1	325	1	325	1	325	-	-	-	-
5. Plaster Preparation.	1	40	1	40	1	40	1	40	1	40
6. Splint	1	80	1	80	1	80	1	80	1	80
7. Instrument Room	1	240	1	240	1	160	1	160	1	160
8. Sterile storage including fuel store.	1	400	1	400	1	320	1	240	1	240
9. Anaesthetist Room.	1	160	1	160	1	160	1	160	1	160
10.Anaesthetic Storage	1	80	1	80	1	80	1	80	1	80
11.Anaesthesia Room.	1	160	1	160	1	160	1	160	1	160
12.Doctors Rooms	2	720	2	480	1	120	1	120	1	120
13.Nurses Rooms	2	320	2	320	1	160	1	160	1	160
14.Sisters Room	1	160	1	160	1	120	1	120	1	120
15.Linen Room (combined with Sister's room).	1	100	1	100	1	80	1	80	1	80
16.Tailor's Room	1	40	1	40	-	-	-	-	-	-
17.Dirty Utility	1	160	1	120	1	80	1	80	1	80
18.Pantry	1	100	1	100	-	-	-	-	-	-

Name of facility	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area i sft.
19. Trolley, Bay	1	120	1	120	1	80	1	80	1	80
20. Janitors alcove	1	60	1	60	1	60	1	60	1	60
21. X-Ray Unit	1	80	1	80	-	-	-	-	-	-
22. (Pre-operative) Reception Room.	2	490	2	280	2	140	1	70	1	70
23. Recovery Room	1 (14 Beds)	1,120	1 (8 Beds)	640	1 (4 Beds)	320	1 (2 Beds)	160	-	-
24. Post-Operative ward.	1 (28 Beds)*	2,240	1 (16 Beds)*	1,280	1 (8 Beds)*	640	1 (4 Beds)*	320	1 (4 Beds)*	320
25. Nurses Station	1	120	1	120	-	-	-	-	-	-
26. Frozen Section	1	80	1	80	1	80	1	80	1	80
27. Stores	1	120	1	120	1	120	1	120	-	-
28. Relatives waiting (including toilet)	2	400	2	400	1	200	1	200	-	-
29. Air Conditioning Plant Room and Switch Room	1	80	1	80	1	80	1	80	1	80
Total:		11,315		8,230		4,615		3,155		2,675

* The total area of this ward should, however, not exceed 10% of the total bed strength of the surgical beds in a hospital.

Name of facilies	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
C.S.S.D. (7)										
General										
1. Administration Office	1	120	1	120						
2. Store Room (New & unsterile)	1	240	1	160	1	240	1	120	-	-
Sterlization unit					1				-	-
3. Wash up area with a counter to receive used goods.	1	180	1	180	1	120	1	120	-	-
4. Check up and assembly.	1	240	1	240	1	180	1	180	-	-
5. Autoclave room.	1	120	1	120	1	80	1	80	-	-
6. Storage and Issue Section.	1	180	1	180	1	120	1	120	-	-
Total:		1,080		1,000		740		620		-
Solution preparation Unit.										
7. Glass washing etc.	1	180	1	120	1	120	1	120	-	-
8. Solution preparation	1	180	1	120	1	120	1	120	-	-
9. Solution Storage & Issue.	1	180	1	120	1	120	1	120	-	-
Total:		540		360		360		360		-
Overall total of floor area.		1,620		1,360		1,100		980		-

PART - F.

Name of facilities	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Dietary (10)										
(a) Staff Accommodation.										
1. Dietitian Room with Toilet.	1	150	1	150	1	120	1	120	-	-
2. Steward's Room with storage space.	1	120	1	120	1	120	1	120	-	-
3. Workmen Rest and change Room.	1	240	1	240	1	180	1	180	-	-
4. Bath and water closet.	1	120	1	120	1	120	1	120	-	-
(b) Stores										
5. Provision Store	1	240	1	240	1	160	1	160	-	-
6. Vegetables Store	1	50	1	40	1	40	1	40	-	-
7. Meat Store	1	40	1	40	1	40	1	40	-	-
8. Milk Store	1	60	1	60	1	40	1	40	-	-
9. Day - to - Day Store.	1	60	1	60	1	40	1	40	-	-
10. Equipment Store	1	100	1	100	1	100	1	100	-	-
11. Fuel Store	1	310	1	310	1	240	1	180	-	-
12. Store for the Supplier	1	120	1	120	-	-	-	-	-	-
13. Janitor's Store	1	60	1	60	1	60	1	60	-	-
(c) Kitchen										
14. General kitchen	1	320	1	320	1	320	1	320	-	-
15. Diet kitchen	1	120	1	120	1	120	1	120	-	-
16. Pantry	1	100	1	100	1	100	1	100	-	-
17. Washing.	1	150	1	150	1	150	1	150	-	-
18. Trolley Bay.	1	80	1	80	1	80	1	80	-	-
Total:		2,440		2,430		2,030		1,970	-	-

PART - F

Name of facilities	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.
Laundry										
(a) If Mechanised										
1. Collection & Sorting of Dirty Linen.	1	240	1	200	1	160	1	160	-	-
2. Sluicing	1	120	1	120	1	120	1	120	-	-
3. Autoclaving	1	160	1	160	1	120	1	120	-	-
4. Washing									-	-
5. Squeezing		200		200		160		160	-	-
6. Drying (Chambers)	1	120	1	120	1	120	1	120	-	-
7. Repair to Linen	1	240	1	180	1	120	-	120	-	-
8. Pressing	1	120	1	120	1	120	1	120	-	-
9. Central Linen Room	1	320	1	240	1	200				
10. Matron's Office	1	120	1	120	1		1			
11. Boiler House	1	320	1	240	1	180	1	180		
12. Mattress Sterilization	1	240	1	180	1	120	1	120		
13. Workmen Rest Room	1	320	1	240	1	180	1	120		
		2,520		2,120		1,600		1,540		
(b) If not Mechanised										
14. Collection of Dirty Linen.	1	240	1	200	1	160	1	160		
15. Receipt of washed Linen.	1	120	1	120	1	120	1	120		
16. Central line Room	1	320	1	240	1	160	1	160		
17. Stores-in-charge (Matron)	1	120	1	120	1	120	1	120		
Total:		800		680		560		560		

Name of facilities	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.
Maternity and Gynaecology (8)										
Out-Patient Department (8.2) (Part -C)										
1. Registration	1	120	1	120	1	180	1	80	-	-
2. Preliminary Examination.	1 (4 cubicles)	300	1 (4 cubicles)	300	1 (2 cubicles)	200	1	200	-	-
3. Consultation & Examination.	2	360	1	180	1	180	1	180	1	180
4. Treatment	1	180	1	180	1	120	1	120	1	120
5. Waiting	1	240	1	200	1	160	1	150	1	150
6. Toilet	1	120	1	80	1	40	1	40	1	40
Total:		1,320		1,060		780		770		490

In-Patient Department (8.3) (Part -D) (Beds 15%)	75 Beds		45 Beds		15 Beds		8 Beds		4 Beds	
Delivery Suite										
1. Administration	1	120	1	120	1	120	1	120	-	-
2. Examination Room	1	240	1	240	1	160	1	120	1	120
3. Labour Room	8	960	5	600	2	240	1	120	1	120
4. Birth Room -	4	1,280	2	640	2	640	1	320*	1	320
(Delivery Room)	1	400	1	400	1	320				
5. Sterilizing	1	180	1	120	1	120	1	120	1	120
6. Scrub-up	2	200	1	100	1	100	1	100	-	-
7. Children Bath	2	200	1	100	1	100	1	100	-	-
8. Doctor's Lockers	1	150	1	120	1	120	1	120	-	-
9. Nurse's Lockers	1	150	1	120	1	120	1	120	-	-
10. Anaesthetists Room.	1	150	1	150	1	150	1	120	-	-

* This room will be utilised for delivery cases as well as for operation cases.

Name of facilities	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.
11. Sterile Storage	1	150	1	100	1	100	1	100	-	-
12. Clean-up	1	80	1	80	1	80	1	80	1	80
13. Janitor's Closet.	1	60	1	60	1	40	1	40	-	-
14. Toilet	2	120	2	80	2	80	2	80	1	40
15. Baby Recovery Room.	1	120	1	120	1	120	1	100	1	100
16. Trolley Bay	1	60	1	60	1	60	-	-	-	-
Total:		4,620		3,210		2,670		1,760		900
Nursing										
17. Maternity ward	48 Beds (2 wards of 24 Beds each)		30 Beds		10 Beds		6 Beds		3 Beds	
(a) 6 - Bedded cubicles	6	2,880	4	1,920	-	-	-	-	-	-
(b) 4 - Bedded cubicles	-	-	-	-	2	640	1	320	-	-
(c) 2 - Bedded cubicles.	4	720	2	360	-	-	-	-	1	180
(d) 1 - Bedded cubicles	4	480	2	240	2	240	2	240	1	120
18. Toilet and lavatory	2	360	1	240	-	-	-	-	-	-
19. Toilet and lavatory	2	240	1	120	1	120	1	120	-	-
20. Toilet and lavatory	2	160	2	80	2	80	2	80	1	80
21. Nursery	2	320	1	240		200		200	-	-
22. Pre -mature Nursery	1	160	1	120						
23. Suspect Nursery	1	160	1	120	1	100	1	100	-	-
24. Treatment Room	1	180	1	180	1	180	1	180	1	180
25. Formula Room	1	120	1	120		120		120	-	-
26. Pantry	1	120	1	80						
27. Matron and Linen store	1	200	1	200	1	150	1	120	-	-
28. Nurse's Duty Room with Toilet	2	360	1	180	1	180	1	180	-	-
29. Doctor's, Duty Room with Toilet.	1	180	1	180	-	-	-	-	-	-
30. Laboratory	1	120	1	120	1	120	1	80	1	80
31. Sluice Room	1	120	1	120	1	120	1	80	1	80
Total:		6,880		4,620		2,850		1,980		1,080

Name of facilities	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in Sft.
Gynaecology										
32. Gynaecology ward	32 Beds		18 Beds		6 Beds		4 Beds		2 Beds	
(a) 6-Bedded cubicles	4	1,680	2	840						
(b) 2 - Bedded cubicles.	2	360	2	360	1	600	1	400	1	200
(c) 1- Bedded cubicles.	4	400	2	200						
33. Toilet		240		160		120		80		80
34. Treatment Room	1	120	1	120	1	120	-	-	-	-
35. Sit out	1	240	1	180	1	120	-	-	-	-
36. Sister's duty Room.	1	120	1	120	1	120	1	120	1	120
37. Clean utility Room	1	120	1	120	1	120				
38. Pantry	1	120	1	120	1	120	-	-	-	-
39. Sluice Room	1	120	1	120	1	120	1	80	1	80
Total:		3,520		2,340		1,440		680		480
Over all Total:		16,340		11,230		7,140		5,030		2,590

Name of facilities	500 - Beds			300 - Beds			100 - Beds			50 - Beds			25 - Beds		
	No. of beds	Built up area/ bed (Sft)	Total Built up area (Sft)	No. of beds	Built up area/ bed (Sft)	Total Built up area (Sft)	No. of beds	Built up area (Sft)	Total Built up area (Sft)	No. of beds	Built up area/ bed (Sft)	Total Built up area	No. of beds	Built up area/ bed (Sft)	Tot Bui up are (Sf
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16
Nursing Unit															
A. Medical	Men														
B. Surgical	200	160	32000	120	160	19200	40	175	7000	22	180	3960	10	100	100
C. Orthopaedics	Women														
D. Eye & E.N.T.	175	160	28000	105	160	16800	35	175	6125	20	180	3600	10	100	100
E. Maternity & Gynaecology	75	160	12000	45	175	7875	15	175	2625	8	175	1400	5	250	125
F. Paediatrics	50	160	8000	30	175	5250	10	175	1750	-	-	-	-	-	-
Total:	500	-	80000	300	-	49125	100	-	17500	50	-	8960	25	-	505
G. Isolation Wards.	8	175	1400	6	200	1200	4	250	1000	2	350	700	2	350	70
Total built-up area excluding external circulation.	-	-	81400	-	-	50325	-	-	18500	-	-	9660	-	-	575

STANDARD WARD UNITS

Name of facility	Sft per Bed	32-Beds No. of Rooms	32-Beds Area in sft.	24-Beds No. of Rooms	24-Beds Area in sft.	20-Beds No. of Rooms	20-Beds Area in sft.	8-Beds No. of Rooms	8-Beds Area in sft.	6-Beds No. of Rooms	6-Beds Area in sft.	4-Beds No. of Rooms	4-Beds Area in sft.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Description													
A.(Main Accommodation.													
1.18-Bed Pavilion ward.	70	1	1260	-	-	-	-	-	-	-	-	-	-
Toilet	10	1	180	-	-	-	-	-	-	-	-	-	-
2.12-Bed Pavilion ward.	70	-	-	1	840	1	840	-	-	-	-	-	-
Toilet	10	-	-	1	120	1	120	-	-	-	-	-	-
3.8-Bed Pavilion ward.	70	-	-	-	-	-	-	-	-	-	-	-	-
Toilet	12	-	-	-	-	-	-	-	-	-	-	-	-
4.6-Bed cubicle	70	2	840	1	420	1	420	1	420	-	-	-	-
Toilet	12	2	150	1	70	1	70	1	70	-	-	-	-
5.4-Bed cubicle	65-70	-	-	1	280	-	-	-	-	1	280	-	-
Toilet	15	-	-	1	60	-	-	-	-	1	60	-	-

Cont.....

Name of facility	Sft per Bed	32-Beds		24-Beds		20-Beds		8-Beds		6-Beds		4-Beds	
		No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in sft.	No. of Rooms	Area in Sft.	No. of Rooms	Area in sft.
1.	2.	3.	4.	5.	6.	6.	8.	9.	10	11.	12.	13.	14.
6. 2-Bed cubicle	90											1	180
Toilet	25-30											1	60
7. 1-Bed cubicle	100	2	200	2	200	2	200	2	200	2	200	2	200
Toilet	30	2	60	2	60	2	60	2	60	2	60	2	60
		2,690		2,050		1,710		760		600		500	
B. (Ancillary Accommodation)													
1. Nurses Duty Room.		1	120	1	120	1	120	1	100	1	100	1	100
2. Clean utility Room.		1	120	1	120	1	100	-	-	-	-	-	-
3. Dirty utility Room.		1	120	1	120	1	100	-	-	-	-	-	-
4. Ward kitchen/pantry.		1	120	1	100	1	100	1	100	1	100	1	100
5. Treatment		1	120	1	120	1	120		-		-		-
6. Stores		1	120	1	100	1	100	1	100		-		-
7. Doctors Room & Toilet.		1	150	1	150	1	150		-		-		-
8. Day Room		1	300	1	240	1	200		-		-		-
9. Dining Room		1	120	1	100	1	80		-		-		-
Total:			1,290		1,170		1,070		300		200		200

WARD STANDARD UNIT (Cont...)

Name of facility	32-Beds No. of Rooms	32-Beds Area in Sft.	24-Beds No. of Rooms	24-Beds Area in Sft.	20-Beds No. of Rooms	20-Beds Area in Sft.	8-Beds No. of Rooms	8-Beds Area in Sft.	6- Beds No. of Rooms	6- Beds Area in Sft.	4 - Beds No. of Rooms	4 - Beds Area in Sft.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
C. Internal Circulation: 7' Corridor	400	400	400	400	350	350	250	250	200	200	150	150
Total:	400		400		350		250		200		150	
D. Floor Area												
Grand Total of (A+B+C).	4380		3620		3130		1300		1000		850	
A. Main Accommodation per bed.	84		85		86		94		100		125	
B. Ancillary Accommodation per bed.	40		49		54		38		33		50	
C. Internal Circulation per bed.	13		17		18		31		33		38	
D. Floor Area per bed (A+B+C).	137		151		158		163		166		213	
E. Wall Area.	21		23		24		24		25		32	
F. Built up Area	158		174		182		187		191		245	
or say	160		175		180		190		190		245	

Note: For 12-4 Bedded wards, the full complement of ancillary accommodation is not provided anvisaging sharing of such facilities with other wards or departments.

SUMMARY OF AREA SCHEDULE IN SFT.

Name of facility	500 Beds	300 Beds	100 Beds	50 Beds	25 Beds	REMARKS
1.	2.	3.	4.	5.	6.	7.
I. IN-PATIENT DEPARTMENTS						
Administrative Unit. (1.2)	4,720	4,040	2,580	2,000	1,760	
Circulation and wall area.	2,360	2,020	1,290	1,000	880	33⅓% of built up area.
Built up area	7,080	6,060	3,870	3,000	2,640	
Diagnostic Unit						
1. Laboratory (2.19)	1,640	1,540	880	480	480	
2. Radiology (4.3.5)	3,520	3,120	2,450	2,410	2,270	
3. Autopsy	860	860	860	620	-	
Total:-	6,020	5,520	4,190	3,510	2,750	
Circulation and wall area.	3,010	2,760	2,095	1,755	1,375	33⅓% of built up area.
Built up area.	9,030	8,280	6,285	5,265	4,025	

Name of facility	500 Beds	300 Beds	100 Beds	50 Beds	25 Beds	REMARKS
1.	2.	3.	4.	5.	6.	7.
Therapeutic Unit						
1. Physio-therapy (5)	3,000	2,680	1,700	1,540	-	
2. Operating Department(6)	11,315	8,230	4,615	3,155	2,675	
Total:	14,315	10,910	6,315	4,695	2,675	
Circulation and wall area.	7157	5,455	3,157	2,347	1,337	33⅓% of built-up area.
Built up area.	21,472	16,365	9,472	7,045	4,012	
Services						
1. C.S.S.D. (7)	1,080	1,000	740	620	-	
2. Solution Preparation	540	360	360	360	-	
3. Dietary (10)	2,440	2,430	2,030	1,970	-	
4. Laundry (11).	2,520	2,120	1,600	1,540	-	
(Mechanised/if not mechanised)*	(800*)	(680*)	(560*)	(560)		
Total:	6,580	5,910	4,730	4,490	-	
Circulation and wall area	3,290	2,855	2,365	2,245	-	33⅓% of built up area.
Built up area.	9,870	8,765	7,095	6,735		

SUMMARY OF AREA SCHEDULE IN SFT (Contd.)

Name of facilities	500 Beds	300 Beds	100 Beds	50 Beds	25 Beds	Remarks
Maternity & Gynaecology(8)						
1. Out Patient Department (8.2)	1,320	1,060	780	770	490	
2. In-Patient Department (8.3)						
(a) Delivery Suites(8.4)	4,620	3,210	2,670	1,760	900	
(b) Nursing (8.5)	6,880	4,620	2,250	1,820	720	
(c) Gynaecology (8.10)	3,520	2,340	1,440	680	480	
Total:-	16,340	11,230	7,140	5,030	2,590	
Circulation & Wall Area	8,175	5,615	3,570	2,515	1,295	33⅓ of Bu
Built-up area	24,515	16,845	10,710	7,545	3,885	up area.
Nursing Unit						
Built up area (less ext. circulation)	81,400	50,325	18,500	9,660	5,750	
External circulation	5,000	3,000	1,000	500	250	@10 sft.
Built-up area	86,400	53,325	19,500	10,160	6,000	per bed.
Miscellaneous						
1. Ambulance Garage (Built up area)	600	600	600	200	200	
2. Driver's quarters (Built up area)	740	740	740	370	370	
3. Garage (Built up area)	1,200	900	600	450	300	
Total:	2,540	2,240	1,940	1,020	870	
Total Built up area of the Inpatient Departments:	1,61,207	1,11,880	58,872	40,770	21,432	
Or Say	1,61,210	1,11,880	58,870	40,770	21,430	
4. Cycle Stand for office staff (@ 6 sft./cycle)	600	360	120	120	120	

SUMMARY OF AREA SCHEDULE OF OUT PATIENT DEPARTMENT

Name of facilities	1000 to 1200 attendance per day. Area in Sft.	750 to 900 attendance per day Area in Sft.	400 to 600 attendance per day Area in Sft.	200 to 300 attendance per day Area in Sft.	Remarks.
1	2	3	4	5	6
Out Patient Department					
1.					
1. General	1,320	1,120	800	420	
2. Surgery	1,140	980	660	460	
3. Orthopaedics	1,080	920	800	-	
4. E.N.T.	580	540	420	420	
5. Dental	610	570	570	540	
6. Eye	480	440	440	200	
7. Medicine	1,430	1,070	870	510	
8. Paediatrics	1,530	1,220	910	120	
9. Dermatology (V.D & Skin)	920	800	600	-	
10. Injection	280	280	280	120	
11. Pharmacy (Dispensary)	1,120	960	680	600	
12. Family Planning	360	360	180	180	
13. Social Worker	240	240	180	-	
14. Emergency & Minor Surgery	2,950	2,950	2,480	1,880	
15. Blood Bank	720	720	440	400.	
	14,760	13,170	10,310	5,850	
Circulation & wall Area.	7,380	6,585	5,155	2,925	33⅓ of built up area.
Built up area.	22,140	19,755	15,465	8,775	
Miscellaneous					
Cycle stand for the O.P.D. Patient for 20% of the daily attendance @ 6 sft. per Cycle (Shed type)	1,440	1,080	720	360	

ABSTRACT OF AREA SCHEDULE IN SFT.

Name of facilities	500 Beds		300 Beds		100 Beds		50 Beds		25 Beds	
	Total Area	Area per Bed	Total Area	Area per Bed	Total Area	Area per Bed	Total Area	Area per Bed	Total Area	Area per Bed
1	2	3	4	5	6	7	8	9	=10	11
INPATIENT DEPARTMENT										
Administrative Unit:	7080	14.2	6060	20.2	3870	38.7	3000	60.0	2640	105.6
Diagnostic Unit	9030	18.1	8280	27.6	6285	62.8	5265	105.3	4025	161.0
Therapeutic Unit.	21472	42.9	16365	54.6	9472	94.7	7045	140.9	4012	160.5
Services	9870	19.7	8765	29.2	7095	70.9	6735	134.7	-	-
Maternity & Gynaecology	24515	49.0	16845	56.2	10710	107.1	7546	150.9	3885	155.4
Nursing Unit	86400	172.8	53325	177.81	19500	195.0	10160	203.2	6000	240.0
Miscellaneous	2540	5.8	2240	7.5	1940	19.4	1020	20.4	870	34.8
Total:	160207	321.8	111880	372.9	58872	588.7	40770	815.4	21432	857.3
or Say	160910	322	111880	373	58870	589	40770	815	21430	857

APPENDIX III

Para No. 2.20.2

RECORD STORAGE

Technical Note

A record room can be fitted with stacks on rollers in any one of the ways suggested in the enclosures. The stacks are almost similar to the popular to the popular types manufactured by M/S Godrej & other Companies except that they are mounted on wheels. It may be necessary to fix up guide rail on top also to ensure stability against wabbling and tilting.

Alternative 1. The stacks are arranged on rails close to each other leaving a clearance of 2" to 3" in between the stack A 3'-6" wide gangway is provided along the side of the long wal With twelve or more stacks close to each other, it is possible create an aisle of 2'-6" to 3'-6" (at any desired point) by pushing apart the stacks. Thus there will be only one transver aisle at a time.

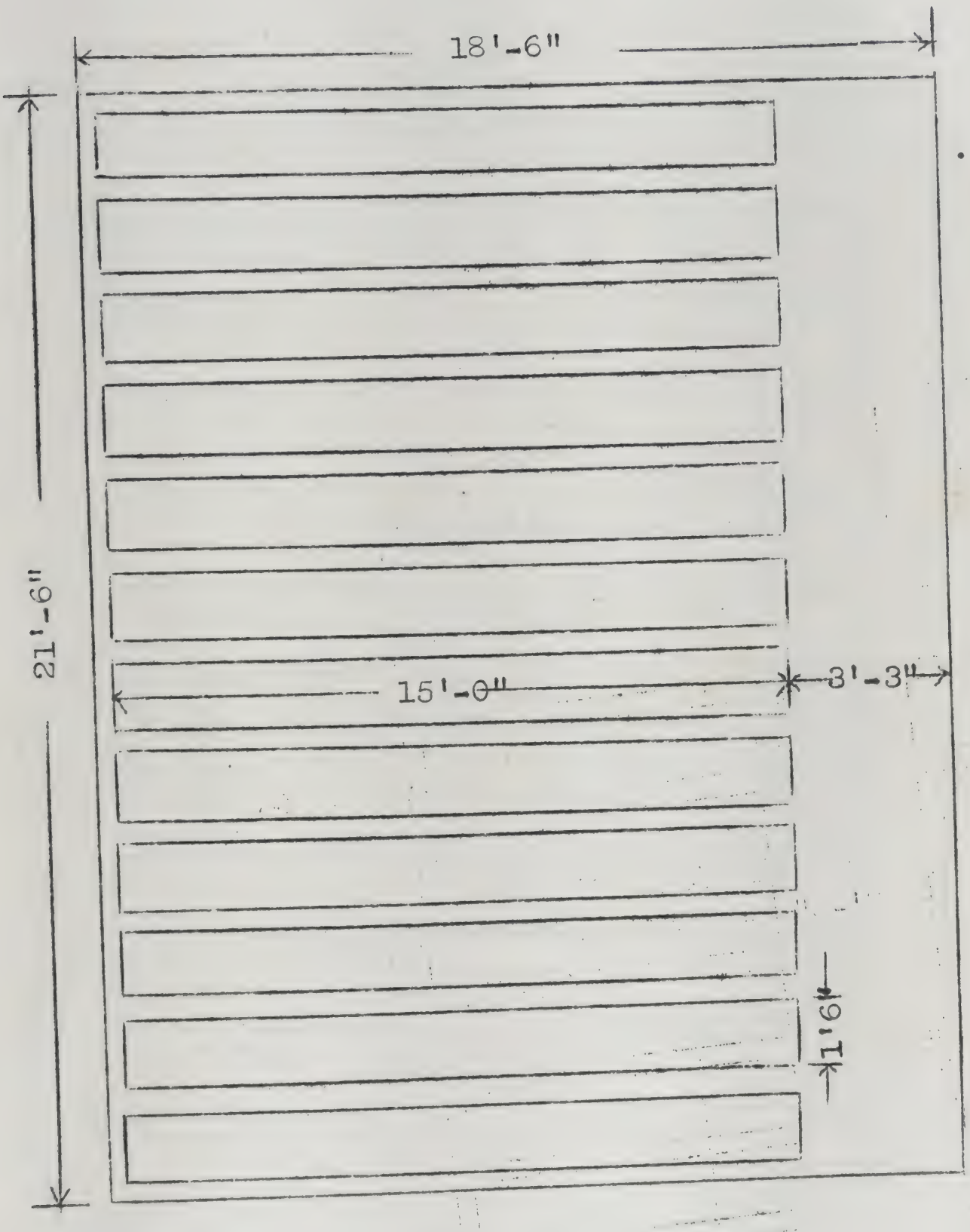
The number of stacks in one block can be 12 to 15. If the number of stacks are more, the arrangement shown in Alternative 3 can be followed creating two or four blocks or even more. It is not necessary that the aisle should be at one end; probably it will be more convenient for operation if the aisle is provided centrally as shown in Alternative 2.

The space utilisation in this arrangement is as much as 70% against 30% to 50% obtaining in most of the offices. There is another advantage in this system especially if the stacks are placed in the upper floors of a multistorey building. Since the rails are fixed the point of application of load is pre-determined. It will be, therefore, possible to provide suitable beams beneath the rails to withstand the concentrated load and design the slab in between only for a nominal load of 50 to 60 lbs per sft. The

relative economy between designing the floor in this way and designing the entire floor slab for a distributed load of 200 to 300 lbs/sft. is obvious.

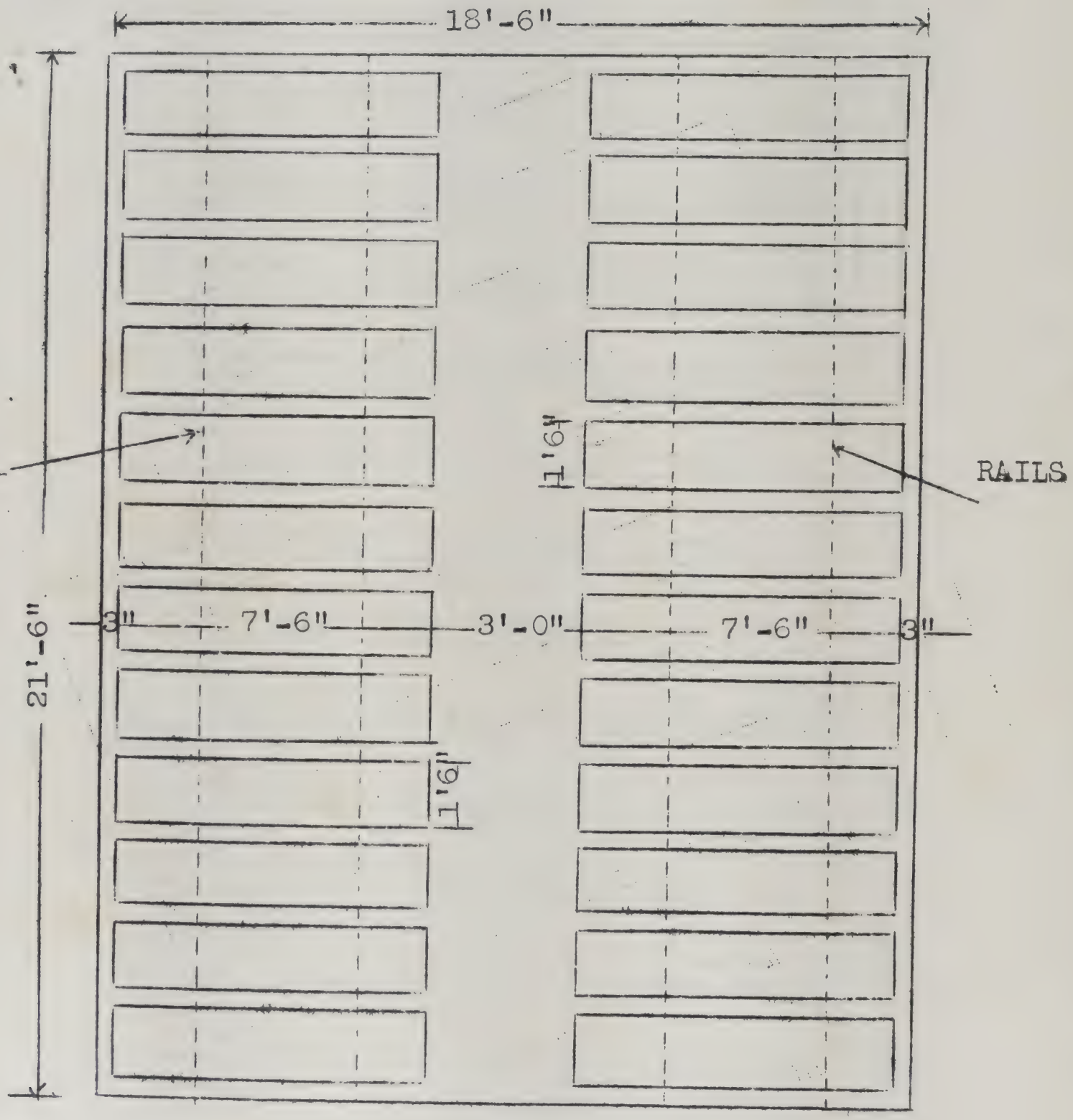
Alternative 4. Yet another alternative is suggested. Here instead of creating an aisle in between the stacks to provide access, the stacks are drawn into the aisle and handled. The space utilisation in this case also is as high as 60%. However, this arrangement does not lend to beam-slab design since the load is distributed all over. Nevertheless, handlings in this case will be very easy.

ALTERNATIVE -1



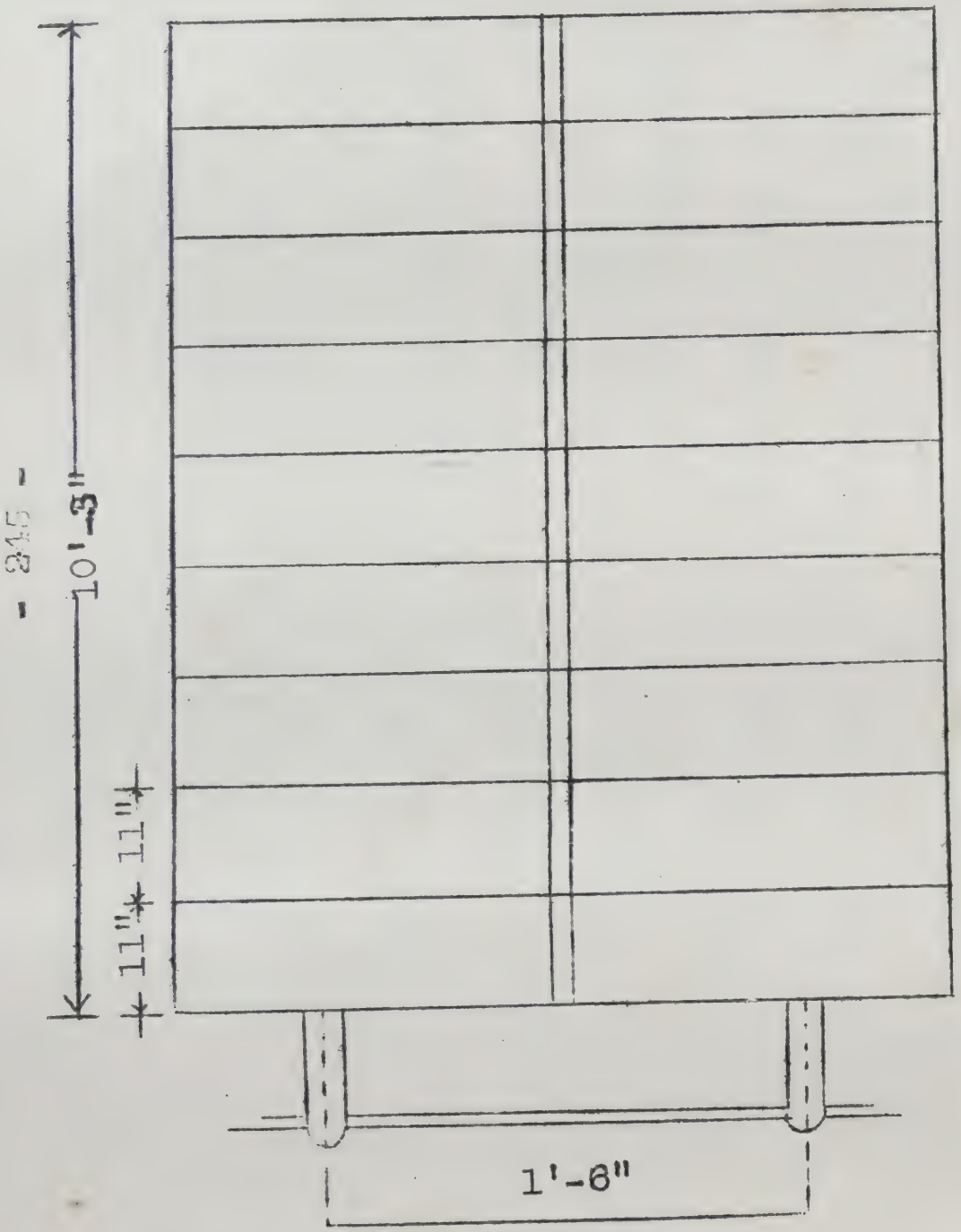
Area of the room	... ...	398 sq.ft.
Area of stack	... ...	270 sq.ft.
Efficiency	... ...	68%

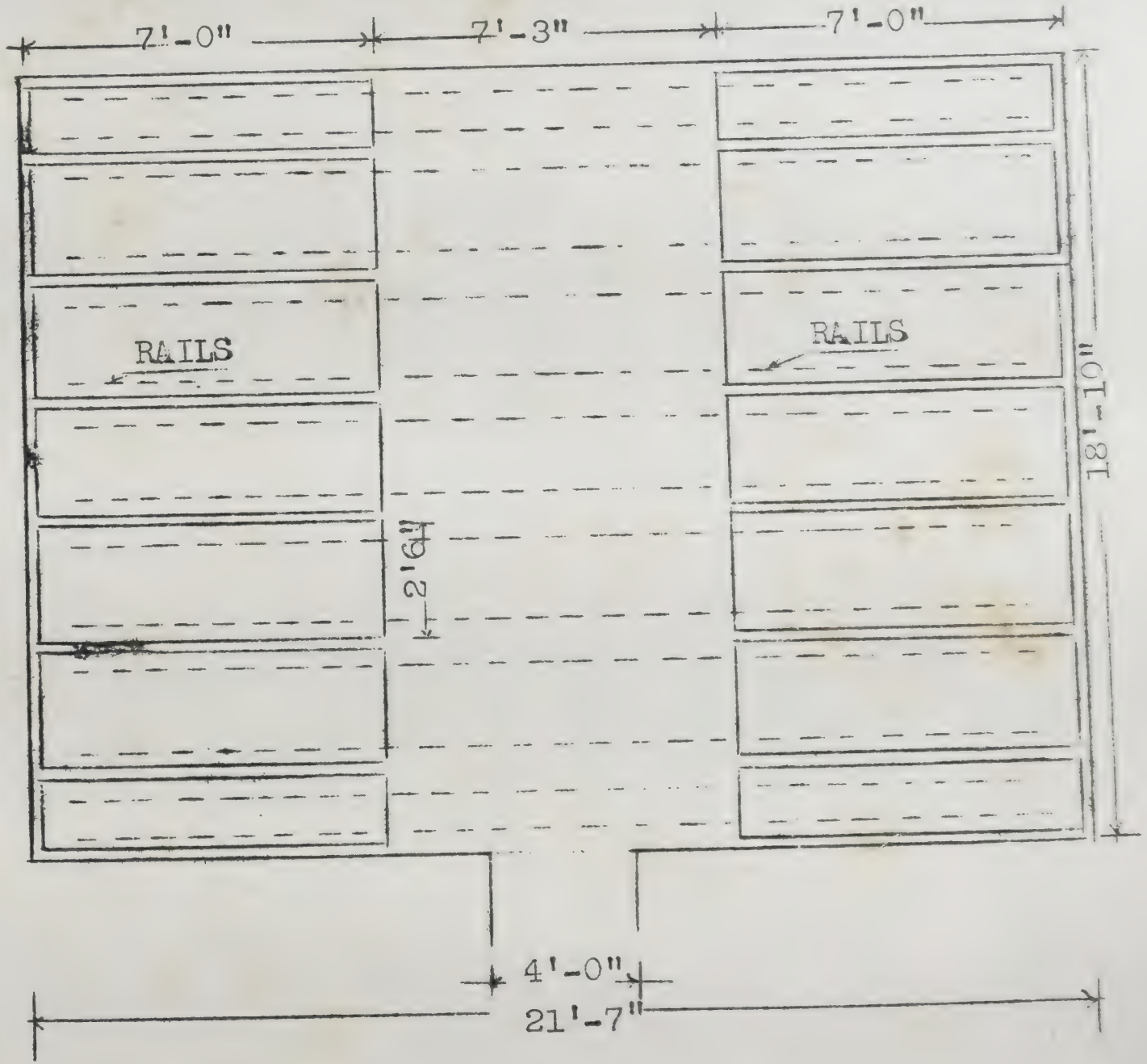
ALTERNATIVE - 2



Area of the room	....	398 sq.ft.
Area of stack	....	270 sq.ft.
Efficiency	....	68%

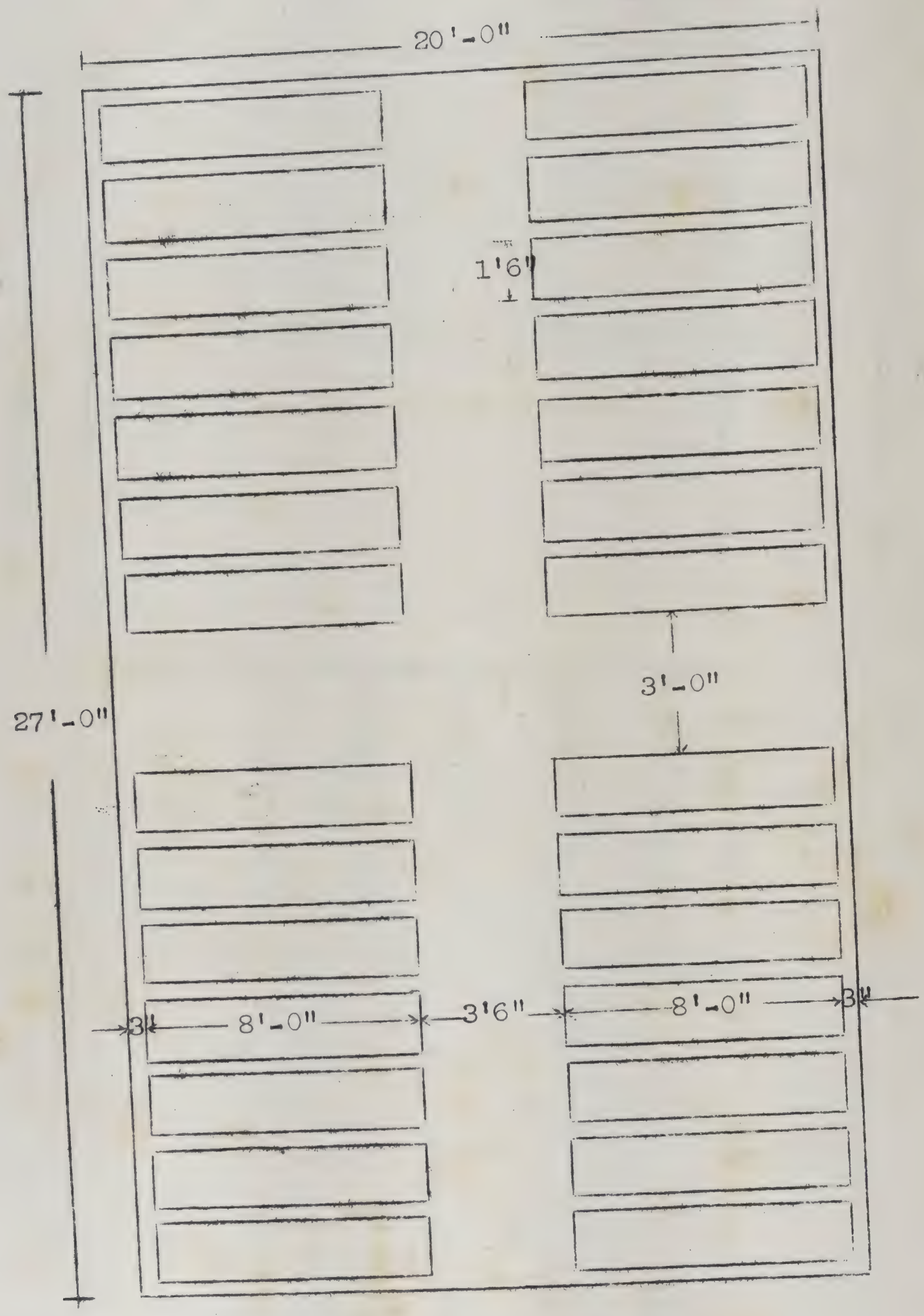
ALTERNATIVE 4





Area of the room 353 sq.ft.

ALTERNATIVE B.



Area of the room .... 540 s
Area of the stack .... 336 s
Efficiency 62%

Note: If the number of stacks per block is increased, the effi
will also increase. For example, if the number of the s
per block is increased to 10 the efficiency will be 66.6

APPENDIX IV
Para No. 14.2.1.

SUMMARY OF IMPORTANT RECOMMENDATIONS ON RESIDENTIAL BUILDINGS.

1. The break up of the built-up area of residential buildings should be within the limits specified below:-

	Load bearing construction	Framed construction
a) Living space i.e. floor area of living, dining and bed rooms.	47-50%	49-54%
b) Service-space covered by kitchen, bath and W.C.	15-20%	14-19%
c) Horizontal circulation space passages and verandahs.	10-12%	9-11%
d) Vertical circulation space-staircases and lifts.	4-7%	3-6%
e) Walls and Columns space.	15-17%	12-14%

2. In developing residential areas, there should be general layout plan for the future of the whole area, flexible enough to be extended as occasion demands, and in addition a provisional and fairly detailed plan showing the possibilities of site development of the areas in which building is immediately contemplated.

3. The gross residential density may vary between 10 to 15 units of houses per acre for single storeyed development and 15 to 20 for double storeyed development. This would result in an approximate net area of 50-55 per cent for

residential sites, 15-20 per cent for roads and the rest for open spaces.

4. House sites may be proportioned with length 2 to 1½ times the width facing the road.

5. Cost of roads forms a substantial portion of the cost of development and must be kept low. The most effective way to achieve this is by keeping their lengths to a minimum.

6. Orientation should be fixed with regard to the functional requirements of rooms and not with respect to the frontage of buildings only.

7. For normal foundation work, cement concrete 1:5:10 proportion should be adequate for buildings up to two storeys 1:4:8 or even a richer mix may be necessary where subsoil water level is high and there is danger of salt imprognation.

8. Plinth levels of all buildings must be determined from drainage consideration and marked on the layout plan. A plinth height of at least 1'-6" above the crown of the approach road is desirable.

9. Ceiling height may vary from 9'-0" to 11'-0" depending upon the type of quarters and whether the building is single or multistoreyed.

10. Where cost of bricks is high, machine made compressed or extruded bricks may be economical.

11. The sizes and number of doors should be regulated by functional requirements and kept down to the minimum commensurate with comfort.

12. Due to shortage of timber, adoption of R.C.C. door frames is suggested for the lower type of houses.

13. Area of windows may be 12 to 15 per cent of floor area for hot and dry climate and 15 to 20 per cent for hot and humid climate.

14. Adoption of R.C.C. frames for windows should be considered, with the easing of steel situation, steel windows may be preferred to wooden windows.

15. For security reasons, protection for windows is necessary in the Upper floors also.

16. For the internal water supply, one pipe system can be conveniently adopted.

APPENDIX V
(Para 15.6.1)

SUMMARY OF IMPORTANT RECOMMENDATIONS ON HOSTEL BUILDINGS

1. The dining space may be provided for 2/3rd the strength of the hostel at the rate of 10 to 12 sft. per student.
2. The kitchen, pantry and store area should be worked out on the basis of 5 to 7 sft./per student
3. A common room of sufficient dimensions for lounge and recreation should be provided. An area of 5 to 6 sq.ft. per student is sufficient.
4. Toilet blocks should be suitably located in the hostel and the provision should be at the rate of one urinal, one wash basin and one bathroom with shower for every eight persons while W.Cs may be one for ten persons.
5. The circulation space which consists of corridors, stair-cases, lobby etc. should not exceed one-third of the total of living, serving and common room space. To the total floor area so obtained the area of walls and columns should be added to obtain the total built-up area. The aim in planning must be to arrive at a total built-up area that does not exceed 2.30 to 2.50 times the room area per student.